University of St.Gallen

Course and Examination Fact Sheet: Autumn Semester 2023

10,368: Causal Machine Learning (GSERM)

ECTS credits: 4

Overview examination/s
(binding regulations see below)
decentral - Analog written examination, Analog, Individual work individual grade (50%, 60 Min.)
Examination time: Term time
decentral - Active participation, Analog, Individual work individual grade (25%)
Examination time: Term time
decentral - Presentation, Analog, Group work group grade (25%)
Examination time: Term time

Attached courses
Timetable -- Language -- Lecturer
10,368,1.00 Causal Machine Learning (GSERM) -- English -- 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) (50%).

Students' active participation in general discussions during lectures and presentations and own presentations (25%).

Empirical project (based on two presentations; 25%).

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 (1/3)

Examination modalities

Examination type	Analog written examination

Responsible for organisation	decentral
Examination form	Written exam
Examination mode	Analog
Time of examination	Term time
Examination execution	Synchronous
Examination location	On Campus
Grading type	Individual work individual grade
Weighting	50%
Duration	60 Min.

Examination languages
Question language: English
Answer language: English

Remark
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Examination-aid rule
Closed Book

The use of aids is prohibited as a matter of principle, with the exception of pocket calculator models of the Texas Instruments TI-30 series and, in case of non-language exams, bilingual dictionaries without any handwritten notes. Any other aids that are admissible must be explicitly listed by faculty members in the paragraph entitled "Supplementary aids" of the course and examination fact sheet; this list is exhaustive.

Procuring any aids, as well as ensuring their working order, is the exclusive responsibility of students.

Supplementary aids

None.

2. Examination sub part (2/3)

Examination modalities

Examination type	Active participation
Responsible for organisation	decentral
Examination form	Oral examination
Examination mode	Analog
Time of examination	Term time
Examination execution	Synchronous
Examination location	On Campus
Grading type	Individual work individual grade
Weighting	25%
Duration	--

Examination languages
Question language: English
Answer language: English

Remark
Includes small presentation.

Examination-aid rule
Free aids provision

Basically, students are free to choose aids. Any restrictions are defined by the faculty members in charge of the examination under supplementary aids.

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3. Examination sub part (3/3)

Examination modalities

Examination type	Presentation
Responsible for organisation	decentral
Examination form	Oral examination
Examination mode	Analog
Time of examination	Term time
Examination execution	Asynchronous
Examination location	On Campus
Grading type	Group work group grade
Weighting	25%
Duration	--

Examination languages
Question language: English
Answer language: English

Remark
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Examination-aid rule
Free aids provision

Basically, students are free to choose aids. Any restrictions are defined by the faculty members in charge of the examination under supplementary aids.

Supplementary aids

No restriction.

Examination content

Empirical work, literature, contents of lecture.

Examination relevant literature
To be defined during the lecture

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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, 24 August 2023);
- Examination information (supplementary aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 16 October 2023);
- Examination information (supplementary aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 45 (Monday, 06 November 2023);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the de-registration period in CW 45 (Monday, 06 November 2023).