

ECTS-Credits	9
Workload Hours	Contact Hours: 60 Independent Study: 120
Duration	1 Semester
Cycle	generally: WS
Language	English
Course Type	Lecture (2 SWS), Tutorial (2 SWS), Self study, Presentation, Coding
blocked	no
PhD-oriented	yes
Method of Assessment	Portfolio
Prerequisite for	-
Registration	alma
Prerequisites	Successful participation in either S411 Advanced Time Series Analysis or S422 Advanced Microeconometrics or comparable courses (please consult Michael Knaus)
Limited Attendance	-
Person Responsible	Prof. Michael Knaus, PhD

This course can be taken as part of the following programs/modules:

<i>Accounting and Finance</i>	if necessary, to clarify with Mr. Brugger and study program representative (Werner Neus)
<i>Data Science in Business and Economics</i>	if necessary, to clarify with Mr. Brugger and study program representative (Dominik Papies)
<i>Economics</i>	if necessary, to clarify with Mr. Brugger and study program representative (Frank Stähler)
<i>Economics and Finance</i>	if necessary, to clarify with Mr. Brugger and study program representative (Joachim Grammig)
<i>European Economics</i>	results from Economics and Finance (free elective studies)
<i>European Management</i>	as in General Management
<i>General Management</i>	if necessary, to clarify with Mr. Brugger and study program representative (Dominik Papies)
<i>International Business</i>	as in General Management
<i>International Economics</i>	if necessary, to clarify with Mr. Brugger and study program representative (Frank Stähler)
<i>Management & Economics</i>	if necessary, to clarify with Mr. Brugger and study program representative (Kerstin Pull)

Content

This module introduces recent methods at the intersection of causal inference and machine learning. This includes (i) methods that leverage supervised machine learning for the estimation of average or heterogeneous treatment effects, like Double Machine Learning and Causal Forests, and (ii) policy learning that recommends ads/policies/treatments/... in a data-driven way, like bandit algorithms. The methods are applied to simulated and real datasets using the programming language R.

Objectives

Students understand the conceptual and statistical foundations of causal machine learning methods and are able to implement them in R. They can judge the quality of data analysis using such methods and are aware of their shortcomings.