

ECTS-Credits	6
Workload Hours	Contact Hours: 60 Independent Study: 120
Duration	1 Semester
Cycle	generally: SS
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	Knowledge of probability theory and ordinary least squares
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

Correlation does not imply causation. This insight is crucial for any data analyst who aims to inform decisions. This course introduces two frameworks to think about causality: (i) potential outcomes that are more prevalent in economics and statistics, and (ii) directed acyclic graphs (DAGs) that are more prevalent in computer science and industry. These frameworks are applied to understand how causal effects can be identified in experiments (A/B testing), natural experiments (instrumental variables, difference-in-differences, regression discontinuity), and more complex causal structures as well as how to discover causal structures. Application are run in R.

In combination with machine learning modules like “S415 Machine Learning in Econometrics” or “DS405 Machine Learning Applications in Business and Economics”, it is the perfect preparation for “DS 407 Causal Machine Learning”.

Objectives

Students develop a thorough understanding of causal inference through the lense of potential outcomes and DAGs. These frameworks and their application allow them to be critical consumers and reflected producers of data analyses that target causal effects.