

<b>MW119: Causal Machine Learning</b>				<b>Study programme:</b>	M
<b>Module type:</b>	<b>ECTS points:</b>	<b>Workload:</b>	<b>Semester of study:</b>	<b>Duration of the module:</b>	
Compulsory Elective	8	240	2 <sup>nd</sup> or 4 <sup>th</sup>	one semester	
<b>Courses:</b>			<b>Contact hours:</b>	<b>Independent study:</b>	<b>Planned group size:</b>
Causal Machine Learning (4 SWS)			60h	180h	20
<b>Learning objectives and competences:</b>					
<p>After completing the module, students are able to</p> <ul style="list-style-type: none"> <li>- classify and apply advanced econometric methods and models;</li> <li>- understand and apply machine learning methods</li> <li>- work with high-dimensional data</li> <li>- see links to other disciplines such as statistics, mathematics, and computer science;</li> <li>- adapt general econometric methods to different estimation problems;</li> <li>- apply machine learning in economic context and combine it with econometric models.</li> </ul> <p>The acquired knowledge is applied actively in exercise tasks using standard software. This promotes the ability to solve statistical problems independently as well as to reflect on them in a critical way.</p>					
<b>Key competences:</b>					
<ul style="list-style-type: none"> <li>- scientific work</li> <li>- critical thinking</li> <li>- analytical skills</li> <li>- willingness to learn and perform</li> <li>- oral and written communication skills</li> </ul>					
<b>Course content:</b>					
<p><b>Course: Causal Machine Learning</b></p> <ol style="list-style-type: none"> <li>1. Causality (Treatment Effects, Potential Outcome Framework, Randomized Experiments, ...)</li> <li>2. Basics in Machine Learning (Regression, Classification, Overfitting, ...)</li> <li>3. Predictive Inference vs. Causal Inference (Conditional Exogeneity, DAGs, ...)</li> <li>4. Causal Machine Learning (Double Machine Learning, Structural Equations, High-Dimensional Econometric Models, ...)</li> </ol>					
<b>Language:</b>					
The course language of all events is English.					
<b>Teaching forms:</b>					
Lecture, group work, independent study.					
<b>Applicability of the module:</b>					
M.Sc. VWL, M.Sc. Economics, M.Sc. BWL, M.Sc. FVM.					
<b>Requirements for participation:</b>					

Admission to the Master's study programmes in „Volkswirtschaftslehre“, „Economics“, „Betriebswirtschaftslehre“ or „Finanz- und Versicherungsmathematik“. Basic knowledge of statistics and econometrics from the Bachelor's study programme and MS00/MV04 is required.

**Forms of examination:**

The final module examination takes place in the form of another examination output.

**Requirements for the award of ECTS points:**

Passing the final module examination. A final module examination is successfully passed if the grade is at least „sufficient“ (4.0).

**Frequency:**

The course takes place in the summer semester.

**Significance of the grade for the final grade:**

This module is graded and taken into account when calculating the overall grade of your Master's degree. For more detailed information on the calculation of the overall grade, please refer to the applicable examination regulations of your respective study programme.

**Module supervisors and full-time lecturers:**

Prof. Dr. Jannis Kück and research assistants

**Other information:**

Up-to-date information can be found on the website of the module supervisor.

Stand: 30.10.2023