DEPARTMENT OF ECONOMICS CURRICULUM
LUND UNIVERSITY

1 Identification and basic information

1. Course Code: **EHNE098**
2. Course title: **Economics: Causal Machine Learning** (Swedish name: **Nationalekonomi: Kausal maskininlärning**)
3. Level: PhD-level
4. ECTS credits: 3
5. Approval: The course has been approved by the board of the Department of Economics (December 2023).
6. Changes: –

2 General information

1. Subject: Economics
2. This is a PhD course in economics.
3. Language: Teaching is in English. (Teaching may be in Swedish if all registered students have a good knowledge of Swedish.)

3 Learning Outcomes

1 Knowledge and understanding

Students shall have a deep understanding of the following:

- the foundations of machine learning from a conceptual and econometric viewpoint
- fundamental methods of predictive machine learning and their application
- fundamental methods of causal machine learning and their application
- uses of causal machine learning for policy advice

2 Competence and skills

Students shall have the ability to independently:

- delineate predictive from causal machine learning approaches
- recognize and identify appropriate application contexts for predictive versus causal methods
- implement machine learning techniques in real-world datasets
- outline the value of machine learning for policy advice
- critically discuss the value of machine learning methods relative to standard methods of causal inference

3 Judgement and approach

Students shall have the ability to pursue further studies in the subject and should be able to search for and evaluate information with a high degree of independence. Students shall also be able to acquire and critically assess the contents of reports and analyses within the subject area.

4 Course Content

This course is an introduction to causal machine learning at the Ph.D. level. The students will first learn the foundations of machine learning from a conceptual and econometric viewpoint, focusing on basic approaches such as regularized regression and random forests. Then, the distinction between predictive and causal machine learning will be outlined. The students will be introduced to different methods of causal machine learning and the contexts in which their use is appropriate. These techniques include, for instance, double selection, T-learning, double machine learning, and causal forests. Finally, a substantial part of the course is focused on the practical implementation of these methods in real-world datasets.

5 Course Design

1. Teaching: Teaching takes the form of lectures and computer lab sessions.

6 Assessment

1. Examination: The assessment consists of a written homework assignment at the end of the course.

2. Limitations on the number of examination opportunities: –

The University views plagiarism very seriously and will take disciplinary action against students for any kind of attempted malpractice in connection with examinations and assessments. Plagiarism is considered to be a very serious academic offence. The penalty that may be imposed for this, and other unfair practices in examinations or assessments, includes suspension from the University for a specified period.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

7 Grades

1. Grading: The official grading scale is Pass and Fail.
2. Weighting grades from different parts of the course: –
3. Grading scales for different parts of the course: –

8 Prerequisites

Students who have been admitted to the PhD programme in Economics at Lund University satisfy the general prerequisites for PhD courses.

9 Other Points

1. Transitional regulations: –
2. Limitations in the period of validity: –
3. Limitations: –
4. Similar courses: –

5. Limitations in renewed examination: –

10 Literature

See separate literature list.