



Course syllabus

School of Business and Economics

Department of Economics and Statistics

4NA098 Avancerad statistisk inläring, 7,5 högskolepoäng

4NA098 Advanced statistical learning, 7.5 credits

Main field of study

Economics

Subject Group

Economics

Level of classification

Second Level

Progression

A1N

Date of Ratification

Approved by School of Business and Economics 2023-01-23

The course syllabus is valid from autumn semester 2023

Prerequisites

General entry requirements for studies at the second-cycle level and specific entry requirements:

- a bachelor's degree in economics or in another main field of study in the social or natural sciences
- 15 credits of statistics at the G1N level, or the equivalent
- English 6 or the equivalent.

Objectives

After completing this course the student should be able to:

- explain central concepts and methods for machine learning
- use common models for machine learning to make inferences about the parameters
- critically reflect upon and use machine learning methods for prediction and decision support
- evaluate the quality of machine learning models
- explain strengths and weaknesses of selected algorithms and machine learning models used for different purposes, such as classification of texts, ranking, and image recognition.

Content

The course contains:

- machine learning methods and their areas of application
- linear regression and regularisation methods (Ridge, LASSO)
- principal component analysis (PCA) and principal component regression (PCR)
- support vector machines
- neural networks, random forest.

Type of Instruction

The teaching consists of lectures and computer exercises.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The course is examined through individual hand-in assignments 7.5 credits.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University. An examiner can, in exceptional cases, decide that a student who is close to the level for a passing grade may carry out supplementary assignments in order to reach the passing grade.

If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customised exam or to have the student conduct the exam in an alternative way.

Course Evaluation

During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course: 1ST810 with 7.5 credits.

Required Reading and Additional Study Material

Required reading

Gareth, J., Witten, D., Hastie, T., Tibshirani, R., *An Introduction to Statistical Learning with Applications in R*. Springer. Latest edition. About 430 pages.

Goodfellow, I., Bengio, Y., Courville, A., *Deep Learning*. MIT Press. Latest edition. About 800 pages.

R online manuals (this electronic resource is part of the software R. The manuals cannot be bought).