



Course syllabus

School of Business and Economics

Department of Economics and Statistics

1ST810 Statistisk inläring, 7,5 högskolepoäng

1ST810 Statistical learning, 7.5 credits

Main field of study

Statistics

Subject Group

Statistics

Level of classification

First Level

Progression

G1F

Date of Ratification

Approved by School of Business and Economics 2021-01-27

The course syllabus is valid from autumn semester 2021

Prerequisites

General entry requirements.

- First-cycle course in statistics, G1N, 15 credits or the equivalent
- English B/English 6, or the equivalent

Objectives

After completing this course the student should be able to:

- explain and describe a number of the concepts and methods central to machine learning
- draw inferences for the parameters in a number of common machine learning models
- use machine learning methods for prediction and decision-making support
- evaluate the quality of machine learning models
- explain the strengths and limitations of selected algorithms/models for machine learning and how they may be used for different applications such as text classification, ranking and image recognition

Content

Course contains:

- introduction to and overview of machine learning and its areas of application,
- linear regression and regularisation methods (Ridge, LASSO),
- principal component analysis (PCA) and principal component regression (PCR),
- support vector machines,
- neural network, random forests.

Type of Instruction

The teaching consists of lectures and computer exercises. The lectures are devoted to a review of theory, concepts and methodology. The computer exercises are devoted to practical data analysis in one with the help of machine learning software. Dates for compulsory elements are stated in the schedule.

Examination

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

The course is examined through computer exercise with assignments.

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. Grading criteria for the A–F scale are communicated in writing to the student by the start of the course at the latest, as well as how the weighting and weighting of grades on individual examining elements to the final course grade takes place. The basis for the student's grade is determined by the student's fulfillment of the objectives.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University. Students who are close to the passing grade of reports can complement after instructions and time-frame given by the examiner to obtain a pass 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.

Required Reading and Additional Study Material

Required readings

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 (electronic resource included in the computer program. The manual is not / should not be purchased).