

Syllabus

for course at advanced level

Machine Learning
Maskininlärning

7.5 Higher Education
Credits
7.5 ECTS credits

Course code:	ML272N
Valid from:	Spring 2022
Date of approval:	2021-10-29
Department	Department of Computer and Systems Sciences
Main field:	Computer and Systems Sciences
Specialisation:	A1F - Second cycle, has second-cycle course/s as entry requirements

Decision

This syllabus was approved by the Head of the Department 2021-10-29.

Prerequisites and special admittance requirements

90 ECTS in Computer and Systems Sciences, including at least:

22.5 ECTS Object-Oriented Programming

7.5 ECTS Data Science or Data Mining (for example the course Data Mining in Computer and Systems Sciences)

(Or equivalent knowledge).

English 6 (or equivalent knowledge).

Course structure

Examination code	Name	Higher Education Credits
MILI	Machine Learning, assignment	3.5
MILT	Machine Learning, written exam	4

Course content

The course addresses the question of how to enable computers to learn from previous experiences. First, the machine learning field is introduced, describing a variety of learning paradigms, algorithms, theoretical results and applications. Then basic concepts from statistics, information theory and probability theory are introduced to the degree they are relevant to machine learning. The course deals with advanced models such as deep learning and focuses on both theory and applications of these models. The course covers ethical aspects of machine learning models, model prejudices at different levels and how they can be handled in an effective way.

Learning outcomes

Upon successful completion of the course, the student should be able to

- describe, implement and apply machine learning methods and techniques for data exploration and data analysis
- reason about the selected processes and algorithms for machine learning
- implement and apply machine learning methods to large and complex amounts of data
- describe, implement and apply machine learning methods and techniques for evaluating results.

Education

The teaching activities in the course are: lectures and exercises.
The language of instruction is English.

Forms of examination

- a. The course is examined through assignments and a written examination.
- b. The final grading of the course is based on the following grading scale related to the learning outcomes of the course: A = Excellent, B = Very Good, C = Good, D = Satisfactory, E = Sufficient, Fx = Fail, F = Fail.
- c. The grading criteria are communicated to the students at the start of the course.
- d. In order to complete the whole course segment the student must obtain at least grade E (or P with Pass/Fail grades) in all course components/examinations.
If there are multiple examinations with grading A to F, the average of the grades is calculated by converting letters into numbers in the following way: A = 4, B = 3, C = 2, D = 1, E = 0. The average is calculated relatively to the number of credits of the various components/examinations and the number of credits of the course. The final grade of the course is thus a weighted average of the course components/examinations. If the average is in between two grades, 2/3 parts of the higher grade are required in order to round up the average.
- e. In addition the following regulations also apply:
 - Students who obtain grade Fx in a written examination task are allowed to complete a supplementary assignment in order to elevate the grade to E.
The examiner informs the concerned students when the results of the written examination are published. The supplementary assignment has to be submitted within a given deadline and can only be utilized to elevate the grade of the actual examination task.
 - Students who obtained grade E in an examination task are not allowed to re-write the examination or resubmit the assignment in order to obtain a higher grade.
 - Students who have failed the same examination task twice are allowed to have another examiner appointed, unless there are special reasons to the contrary.

Interim

When a course is discontinued, or its contents are substantially altered, the following applies:

- Failed examination tasks are replaced with other similar examination tasks according to a specific plan.
- If no similar examination tasks can be provided, at least three examination opportunities per examination task should be offered during a period of at least three terms from the date of the decision. After this period, no examinations should be carried out on the course.

Limitations

This course may not be included in a degree together with a course, taken in Sweden or elsewhere, of identical or partially similar content.

Required reading

Information about course literature is available on the department's website - www.dsv.su.se - at least two months before the start of the course.