Master Thesis in Statistics

Masteruppsats i statistik
30 credits

Programme course

732A64

Valid from: 2023 Spring semester

Determined by	**Main field of study**	
The Quality Board at the Faculty of Arts and Sciences	Statistics	
Date determined	**Course level**	**Progressive specialisation**
2017-01-15	Second cycle	A2E
Revised by	**Disciplinary domain**	
Course and Programme Syllabus Board at the Faculty of Arts and Sciences	Technology	
Revision date	**Subject group**	
2022-10-21	Statistics	
Offered first time	**Offered for the last time**	
Spring semester 2018	Spring semester 2025	
Department	**Replaced by**	
Institutionen för datavetenskap	732A67	

Course offered for

- Master's Programme in Statistics and Machine Learning

Entry requirements

- Bachelor's degree equivalent to a Swedish Kandidatexamen within statistics, mathematics, applied mathematics, computer science, engineering or a similar degree.
- Completed courses with passing grade in following subjects:
  - calculus
  - linear algebra
  - statistics
  - programming
- English corresponding to the level of English in Swedish upper secondary education (Engelska 6)
  Exemption from Swedish
- At least 54 ECTS credits passed in the main field of Statistics at second cycle and at least 6 ECTS credits in the main field of Computer Science at second cycle
- Passed courses Machine Learning, 9 ECTS credits, and Statistical Methods, 9 ECTS credits.

Intended learning outcomes

After completion of the course, the student should be able to:

- search, collect and integrate relevant scientific literature in relation to your own problem formulations
- independently identify, formulate and solve statistical problems by using relevant methods for analysis and evaluation
- apply mathematical models underlying the selected analysis methods and adapt these models to the given problem
- efficiently implement statistical machine learning methods in a programming language, and apply the implemented technological solution to the problem identified in the thesis
- plan and carry out scientific work within given time frames
- identify relevant sources of information, conduct information searches, critically assess the obtained information, and to use correct referencing to prior work
- communicate the problem formulations of the scientific work, its solutions, and other relevant information, both orally and in written form
- critically assess and evaluate own work and the work of others with respect to relevant scientific, societal and ethical dimensions
- apply analytical tools in the practice of a profession in Statistics

Course content

The following is covered in the course:

- problem formulation and its presentation to a number of research problems
- identification of relevant research articles
- selection of suitable models from machine learning, data mining, statistics and related fields
- studies of the underlying mathematical models, adaptation/modification of such models to the given research context
- implementation of the models in a computer language, code verification and simulations
- analysis of simulation results, model and code adjustments
- interpretation of the obtained output, comparison of the selected models and their output with the results published by the research society
- summary of the studies and results in terms of a master thesis
- oral presentation and opposition of the scientific work

Teaching and working methods

The teaching consists of lectures, seminars, individual work, supervision and feedback. In addition to this, the student shall pursue self studies.

The student has the right to supervision during the semester the student is registered at and completing the master thesis. If there are special reasons, and if the supervising resource has not been used up during the current semester, the course responsible can in consultation with supervisors decide to offer supervision during the next semester.

Examination and teaching language: English

Examination

The course is examined through:

- active participation in seminars, grading scale: EC
- individually written half-term report, grading scale: EC
- individual oral presentation, grading scale: EC
- individual oral and written opposition, grading scale: EC
- individual oral response, grading scale: EC
- individually written thesis, grading scale: EC

Each examined part gives a number of course points.

For Pass (E) as the final grade, at least one course credit is required on all parts.

A higher grade is based on a weighted average of all parts.

In order to be partially examined on oral presentation, oral and written

opposition and oral response at least one course credit in active participation at seminars and at least one course credit on individual half-term report are required.

In order to be partially examined on the written thesis, at least one course credit is required on all other parts.

Detailed information can be found in the study guide.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

ECTS, EC

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is carried out in such a way that both men´s and women´s experience and knowledge is made visible and developed.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.