

Education plan

for

Master's Programme in Mathematical Statistics and Machine Learning
Masterprogram i matematisk statistik och maskininlärning

**120.0 Higher Education
Credits**
120.0 ECTS credits

Programme code: NMSMM
Valid from: Autumn 2023
Date of approval: 2023-02-07
Department: Department of Mathematics (incl. Math. Statistics)

Decision

This syllabus has been approved by the Board of the Faculty of Science at 2023-02-07.

Prerequisites and special admittance requirements

In order to be admitted to the program, knowledge equivalent to a Bachelor's degree, with at least 45 credits of Mathematics, 15 credits of Computer Science/Computational Mathematics and 45 credits of Mathematical Statistics, is required. English 6 or the equivalent.

Programme structure

The programme consists of mandatory courses of 45 credits, a degree project of 30 credits, elective courses of at least 22.5 credits, and freely chosen (optional) courses of at most 22.5 credits.

Goals

After having completed the program a student has to fulfill the requirements of a Master's Degree. The main field of study is Mathematical Statistics. The program is designed in such a way that methods of machine learning are highlighted. After completion of the program the student is expected to either work as a qualified statistician within the private or public sphere, or continue with research education in Mathematical Statistics.

Knowledge and understanding:

For a Master's Degree the students must

- demonstrate knowledge and understanding within Mathematical Statistics, including modern methods of machine learning. This includes broad knowledge in the field of study as well as substantially deeper knowledge in certain parts of the field, together with a deeper insight into current research and development work,
- demonstrate deeper methodological knowledge within Mathematical Statistics, including modern methods of machine learning

Skills and abilities

For a Master's Degree the student must

- demonstrate an ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations, even when limited information is available,
- demonstrate an ability to critically, independently and creatively identify and formulate issues and to plan, and in using appropriate methods, carry out advanced tasks within specified time limits, so as to contribute to the development of knowledge and to evaluate this work,
- demonstrate an ability to clearly present and discuss the conclusions and the knowledge and arguments

behind them, in a dialogue with different groups, orally and in writing, in national and international contexts,

- demonstrate the skill required to participate in research and developmental work or to work independently in other advanced contexts.

Evaluation and assessment ability

For a Master's Degree the student must

- demonstrate an ability to make assessments within Mathematical Statistics, including modern methods of machine learning, where relevant scientific, social and ethical aspects are taken into account, and demonstrate an awareness of ethical aspects of research and development work,
- demonstrate insight into the potential and limitations of science, its role in society and people's responsibility for how it is used, and
- demonstrate an ability to identify the need of further knowledge and to take responsibility for the acquirement of knowledge.

Courses

Compulsory courses:

1. Probability Theory III, 7,5 credits (MT7047) (*)
2. Statistical Models, 7,5 credits (MT7046) (*)
3. Stochastic Processes and Simulation II, 7,5 credits (MT5012) (*)
4. Statistical Learning, 7,5 credits (MT7049) (*)
5. Unsupervised Learning, 7,5 credits (MT7050) (*)

At least one of 6-7:

6. Statistical Consultancy Methodology, 7,5 credits (MT8001) (*)
7. Mathematical Communication, 7,5 credits (MM7020)
8. Mathematical Statistics, Degree Project, 30 credits (MT9013) (*)

Elected courses of at least 22,5 credits. The list of elected courses is decided by the departmental board, and it is updated each new academic year. Before the program starts, a list with a minimal supply of elective courses is provided, for which teaching is guaranteed before the end of the program.

Optional courses of at most 22,5 credits.

* The courses are part of the main field of study for the program - Mathematical Statistics.

Degree

Master's Degree

Misc

Students, who were admitted to the program and did not finish it within two years, may request that they are allowed to finish the program even after it has ceased to apply. Thereby the limitations given in the syllabi of the courses in the program must be taken into consideration.