MSc in Machine Learning, Systems and Control

LUND UNIVERSITY | SWEDEN

- Master of Science in Machine Learning, Systems and Control
- 2 years, full-time, 120 ECTS credits
- Faculty of Engineering
- Lund Campus
- Application deadline: January 2023
- Programme start: August 2023

PROGRAMME OVERVIEW

The amount of available data in the world is exploding and advanced algorithms are used to extract information for use in different applications such as self-driving cars, optimised manufacturing, improved healthcare and more energy-efficient systems. The Master's programme in Machine Learning, Systems and Control prepares students for a flexible future-proof career within this general area where advanced algorithms are used to analyse large datasets in a wide range of applications combining methods of statistical analysis, mathematics, signal processing, image analysis and control theory. Demand for experts with such knowledge is growing, meaning an optimistic job market for graduates.

The programme is a result of collaboration between the departments of Mathematics, Automatic Control, Computer Science and Electrical and Information Technology at Lund University.

The Shanghai ranking (ARWU) ranks Lund University on place 17 among top universities in the world in the field Electrical and Electronic Engineering for the year 2018 and on place 49 in the field of Automatic Control. Lund University has excellent resources and can offer students the opportunity to learn from world-leading researchers. Research and education are closely linked, and the four involved departments have a long tradition of successful cooperation within education and research. All of our teachers have PhD's or higher and are actively engaged in research.

You will have some freedom to choose courses fitting your personal interest and can choose between two tracks with slightly different compulsory courses and a set of elective courses facilitating a preference towards e.g. machine learning, control systems, image analysis, artificial intelligence, robotics. The courses included in the programme are kept to a high international standard. The programme features both theoretical and practical learning, as well as group assignments and presentations.

In addition to courses, all of our students undertake a research project for their Master's thesis. The project can be done either in cooperation with industry or be of an academic nature and can be carried out either locally or abroad. Located next to the engineering faculty there is a lively science park, Ideon, with a long tradition of innovations within software, internet of things, telecommunication, energy and new materials.

PROGRAMME MODULES/COURSES

COMPULSORY COURSES AND NUMBER OF CREDITS: Introduction to Machine Learning, Systems and Control (7.5), Modeling and Learning from Data (7.5), Image Analysis (7.5), Introduction to Artificial Neural Networks and Deep Learning (7.5), Automatic Control, Advanced Course (7,5), Master's degree project (30). Additionally compulsory in Track 1: Artificial Intelligence (7.5), Machine Learning (7.5), Monte Carlo Methods for Statistical Inference (7.5) + Elective courses (30 in total). Additional compulsory in Track 2: Real-Time System (7.5), Project in Systems, Control and Learning (7.5) + Elective courses (37.5 in total). The Elective courses can be chosen from a long list of alternatives, see the programme webpage for details.

CAREER PROSPECTS

A Master of Science in Machine Learning, Systems and Control provides students with a solid base for a career in both industry and academia and the necessary skills for both research and development in different areas of industry. The programme also provides a good foundation for PhD studies in the field. The surrounding region is home to a number of global brands such as Sony, Ericsson, Axis. Other companies with operations close to Lund University include Volvo, DB Schneider, Tetra Pak, and ARM Sweden. A large proportion of our engineering students

> "The programme is important for potential employment of Master level engineers. It is expected that the new Master's programme will further enhance the competence in the region and strengthen this important area for Sony."
>
> Sony Mobile Communications

> "Machine Learning has been pointed out by top management as an especially important area for future competitivity, and as such recieves dedicated funding and resources. We have also identified the need for a more extensive Master student training in the mathematical methods used for machine learning."
>
> Perstorp Holding AB

start working with these companies directly after graduation or create their own startup company, sometimes with the help of Venture Lab business incubator. Within the near future, there will be two large-scale European and international research centres – ESS and MAX IV – offering even more exciting opportunities for our students.

ENTRY REQUIREMENTS AND HOW TO APPLY

Entry requirements

A Bachelor's degree in science, technology, engineering, mathematics (STEM) or equivalent. Completed courses in mathematics (linear algebra, calculus in one and several variables, transforms and linear filtering) of at least 30 credits/ECTS, as well as one completed course in mathematical statistics, one in computer programming or computer science and one in control engineering. English Level 6.

How to apply

1. **Apply online:** Go to www.lunduniversity.lu.se/machine-learning. Click on "Apply" and follow the instructions for the online application at www.universityadmissions.se, the Swedish national application website. Rank the chosen programmes in order of preference.
2. **Submit your supporting documents:**
   - **General supporting documents:** Check what documents you need to submit (i.e. official transcripts, degree diploma/proof of expected graduation, translations, proof of English, passport) and how you need to submit them at www.universityadmissions.se.
   - **Programme-specific supporting documents:** For information on programme-specific documentation, please check the programme webpage.
3. **Pay the application fee (when applicable)**

Tuition fees

Tuition fee SEK 155 000 per year for non-EU/EEA citizens. No fee for EU/EEA citizens.

Selection criteria/additional information

The selection is based on academic qualifications and on a statement of purpose.

ABOUT THE FACULTY OF ENGINEERING

The Faculty of Engineering, LTH, is a place for dreams and discoveries. We inspire creative development of technology, architecture and design and teach some of Sweden's most attractive Master's programmes, all built on a broad research base. LTH is among the leading engineering faculties in Europe with nearly 10 000 students. Over 1 000 researchers at LTH work hard to improve the quality of life for people and promote more careful use of the Earth's resources. A world record in 5G technology, solar cell-driven water purification, early cancer diagnosis, nanotechnology for more efficient solar panels, and a health-promoting oat drink are some of the innovations developed at LTH. Together we explore and create – for the benefit of the world.

CONTACT

Programme webpage:
www.lunduniversity.lu.se/machine-learning

Programme Directors:
Mikael Nilsson
msc.mlsc@lth.lu.se
+46 46 222 0896

Bo Bernhardsson
msc.mlsc@lth.lu.se
+46 46 222 8778

Lund University was founded in 1666 and is repeatedly ranked among the world's top 100 universities. The University has around 46 000 students and more than 8 000 staff based in Lund, Helsingborg and Malmö. We are united in our efforts to understand, explain and improve our world and the human condition.

Learn more at www.lunduniversity.lu.se

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