LUND UNIVERSITY

LTH
FACULTY OF ENGINEERING

Programme Syllabus

Master's Programme in Machine Learning, Systems and Control

- Faculty: Faculty of Engineering, LTH
- Programme code: TAMSR
- Credits: 120
- Admission level: Bachelor's degree
- Degree level: Second cycle
- Approved by: Programme Board F/Pi
- Approval date: 12 February 2026
- Validity: Academic year 2026/2027
- Entry into force: 12 February 2026

1 Aim and outcomes

1.1 Aim

This internationally oriented master's program aims to develop the student's knowledge, skills and competence in the area of Machine Learning, Systems and Control.

1.2 Outcomes for a Degree of Master of Science (120 credits)

(Higher Education Ordinance 1993:100)

Knowledge and understanding

For a Degree of Master of Science (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and

- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information,
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work,
- demonstrate the ability in speech and writing both nationally and internationally to report clearly and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Judgement and approach

For a Degree of Master of Science (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work,
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning.

1.3 Specific outcomes for a Degree of Master of Science (120 credits) in Machine Learning, Systems and Control

Knowledge and understanding

For a Degree of Master of Science (120 credits) students shall

- demonstrate broad insight, understanding, and intuition of the whole process of extracting knowledge from data,
- demonstrate sufficient deep knowledge in the specialisation to select, apply and implement suitable methods for the analysis of large data sets and control of complex systems, and
- have knowledge of the theoretical properties of methods as well as suitable implementations in one of the program tracks.

Competence and skills

For a Degree of Master of Science (120 credits) students shall

- identify and formulate issues, even in case of limited information, and use appropriate methods from the field of study to autonomously solve the identified tasks,
- use a mathematical language to communicate and interact with scientists and engineers as well as people in non-technical fields, and
- follow and participate in research and development related to the chosen track.

Judgement and approach

For a Degree of Master of Science (120 credits) students shall

- professionally reflect on the potential ethical issues with processing large data sets as well as the risks of using autonomous systems,
- critically assess technical reasoning and determine its validity, and
- identify the need for further knowledge in the field and take responsibility for keeping their personal knowledge up to date.

2 Programme structure

The programme starts with a mandatory block during the first semester. This is intended to form a joint knowledge basis for all students, but also to implement learning outcomes such as teamwork abilities, oral and written communication. The mandatory block is followed by two elective mandatory tracks during the second semester; the Machine Learning track or the Systems and Control track. In addition, elective courses of 45 credits are included. The programme is concluded by a degree project worth 30 credits.

Mandatory courses in the Machine Learning track:

- FMAN45 Machine Learning
- FMSN50 Monte Carlo and Empirical Methods for Stochastic Inference

Mandatory courses in the Systems and Control track:

- FRTN60 Real-Time Systems
- FRTN70 Project in Systems, Control and Learning

2.1 Courses

The courses included in the programme are indicated in the timetable. Students are entitled to accreditation of 7.5 credits of courses in Swedish (organised by Lund University for exchange students).

2.2 Further studies

On completion of the second-cycle degree, students have basic eligibility for third-cycle studies.

3 Admission requirements

A Bachelor's degree in science, technology, engineering or 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 6.

4 Degree

4.1 Degree requirements

For a Degree of Master of Science (120 credits) students must successfully complete courses comprising 120 credits, including a degree project worth 30 credits. At least 90 credits must be second-cycle credits and at least 60 credits of those must be in the main field of study, including the degree project.

4.2 Degree and degree certificate

When students have completed all the degree requirements, they are entitled to apply for a certificate for a Degree of Master of Science (120 credits). Main Field of Study: Machine Learning, Systems and Control.