

Programme Syllabus

Master's Programme in AI and Machine learning (120 credits)

**Masterprogram i AI och maskininläring
(120 högskolepoäng)**

Established by: Pro-Vice-Chancellor and the Deans

Date of establishment: 20 March 2023

Reg no: BTH-4.1.10-0274-2023

Programme code: DVAMA

Adopted by: Pro-Vice-Chancellor and the Deans

Date of adoption: 3 November 2025

Date of revision: 1 June 2026

Reg no: BTH-4.1.13-0555-2026

Applies to students admitted: autumn 2026

Part 1 — Description of the degree programme

Entry requirements

Admission to the degree programme requires:

Bachelor of Science in Engineering or Bachelor of Science in a technical area. At least 20 credits should consist of courses in Computer Science, Software Engineering or equivalent and include courses in object-oriented programming, 5 credits, algorithms and data structures, 5 credits, database technique, 5 credits and a project course, 5 credits. At least 24 credits should consist of courses in Mathematics and include courses in univariate analysis, 5 credits, linear algebra, 5 credits, statistics, 5 credits and discrete mathematics, 5 credits. English 6.

Outcomes and content

The Master's programme in AI and Machine learning is a two-year technical master's programme. The field of education covers the technologies and methods used to create intelligent technical systems.

A large part of the programme's courses is in the main field of study Computer Science, but courses in Software Engineering, Industrial Economics, and Mathematical Statistics also occur. The programme concludes with a master's thesis, which should be based on current research and scientific literature and/or self-designed studies.

After the student has obtained his or her master's degree, he or she is well prepared for both work in the business world and research studies.

National outcomes

Knowledge and understanding

For a Degree of Master (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 (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 clearly report 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 (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.

Content

In the first year of the Master's programme, the studies begin with two courses, one in Applied Artificial Intelligence and one in Machine Learning. These courses lay the foundation for further studies in the field. In addition to these fundamental courses, the student will be able to take a wide range of advanced courses,

including Advanced Machine Learning and Deep Learning, which build on the first two courses.

Furthermore, the program includes courses in adjacent fields, such as Software Engineering, where students learn how to design, develop, and implement robust and scalable software systems. Courses in Mathematical Statistics are an essential part of this education, providing students with the mathematical tools required to model, analyze, and draw conclusions from data.

The programme also offers in-depth courses like Robotics as well as Time Series and Predictive Methods. The student also can study ICT Startups and High-Tech Entrepreneurship, which provides a broader understanding of how technological solutions are implemented in practice, as well as a foundation for starting their own business.

The second year begins with a course in research methodology and a project course in software development, in which the student gets to apply his/her knowledge in practical projects. During the autumn, an elective course is also offered that the student chooses according to their interests and career goals. The programme concludes with a Master's thesis in Computer Science, which is usually carried out in close collaboration with industry or within the framework of a research project.

The courses and their positions in the degree programme are presented in Part 2.

The degree programme undergoes continuous evaluation and development, which may result in changes in the range of courses offered.

Implementation and instruction/teaching

The learning activities and teaching elements in the education, such as lectures, seminars, laboratory sessions, projects, report writing and student presentations, are carried out on campus. Activities will be carried out both individually and in groups.

The outcomes of the programme are achieved through the courses included in the programme. Assessment and examination take place at course level. Course objectives, examination and assessment are described in each course syllabus.

The programme's structure is designed in a way that promotes students' opportunities to study a semester abroad. The studies abroad can either be conducted at one of BTH's partner universities or at other suitable universities. The appropriate semester for studying abroad is semester 3. There may also be the opportunity to study several semesters abroad, but this requires a more controlled choice of courses and thus more preparation.

The degree programme is taught in English.

The university's perspectives

At the university, several perspectives are central - partly to strengthen the strategic focus and profile, and partly to meet the legal requirements that apply to education. At BTH, the perspectives of responsible academia, innovative development, and collaboration are integrated into all educational programmes. Programme managers and teachers work continuously to weave these perspectives into the content of the programmes.

Conditions for participation in programme courses

In order to participate in the courses of the degree programme, the student must be admitted and registered on the courses. In order to be admitted to compulsory or elective courses, the student must be eligible, i.e. meet the course's entry requirements, no later than at the start of the course. Eligibility checks are carried out before each course starts.

The number of study places on elective courses within the programme may be limited. If there are too few applicants, an elective course may be cancelled.

Degree

After completing the studies, the student can apply for a degree. In order to obtain the degree stated below it is required that the objectives for qualifications in accordance with the Higher Education Ordinance have been achieved as well as the requirements stated in the Local Degree Ordinance at BTH have been met.

The programme leads up to the following second-cycle degree:

Degree of Master of Science (120 credits)
Main field of study: Computer Science
Specialization: AI and Machine Learning

Part 2 — Courses in the programme

Master's Programme in AI and Machine Learning (120 credits)

Admitted: autumn 2026

The name of the course	Course code	Credits	Autumn Sp1	Autumn Sp2	Spring Sp3	Spring Sp4
Education year 1						
Software Architecture Software Engineering, Technology; First cycle; GIF	PA1483	6	X			
Decision Support System Computer Science; Second cycle; A1N	DV2643	6	X	X		
Applied Artificial Intelligence Computer Science, Technology; Second cycle; A1N	DV2659	6	X			
Bayesian Statistics The course doesn't belong to any main field of study at BTH; Second cycle; A1N	MS2506	6		X		
Machine Learning Computer Science, Software Engineering; Second cycle; A1N	DV2638	6		X		
ICT Startups and High-Tech entrepreneurship Industrial Economics and Management, Second cycle, A1N	IY2645	6			X	X
Robust Methods The course doesn't belong to any main field of study at BTH, First cycle, GIF	MS1415	6			X	
Advanced Machine Learning Computer Science; Second cycle; A1F	DV2640	6			X	
Deep Machine Learning Computer Science; Second cycle; A1N	DV2646	6				X
Robotics Electrical Engineering, Computer Science; Second cycle; A1N	ET2627	6				X
Education year 2						
Advanced software engineering project in teams Software Engineering, Second cycle; A1N	PA2611	18	X	X		
Research Methodology in Computer Science Computer Science; Second cycle; A1N	DV2654	6	X			
Master's Degree project in Computer Science Computer Science; Second cycle; A2E	DV2649	30			X	X
One or more elective courses. See choices below.		6	-	-	-	-

Elective courses education year 2						
Security, Privacy, and Compliance in Software Systems Software Engineering, Second cycle, A1N	PA2603	6		X		
Multiprocessor Programming Computer Science, Technology; Second cycle; A1N	DV2606	6		X		
Technology venture 2: Commercialization of Innovations Industrial Economics and Management, Second cycle, A1F	IY2650	6		X		
Generative Artificial Intelligence Computer Science; Second cycle; A1N	DV2658	6		X		