

**SYLLABUS**

**STUDY YEAR 2024/2025**

# **Master Programme in Applied AI**

## **Enrollment semester Autumn 2024**

**DATE**

**2023-10-12**

**REFERENCE NO.**

**LTU-4268-2023**

**DECISION MAKER**

**Dean of the Faculty of Science and Technology**

## Programme content and structure

The program consists of a total of 120 ECTS out of which 90 ECTS are courses at advanced level in the area of Computer Science. The final thesis constitutes 30 ECTS. The program is available by distance and on campus.

During the first year of the programme, you will take courses that focus on the core concept of Applied Artificial Intelligence (AI) and provide you with the appropriate knowledge to continue with more advanced and specialized courses in the second year. In particular, you will gain knowledge in programming needed for using tools within machine learning and AI, in understanding concepts of AI, machine learning, advanced deep learning and pattern recognition. You will understand how AI is connected with various different areas like business development, and healthcare.

During the second year of the programme, you will take courses in advanced data mining and how to apply AI for targeted solutions (e.g., in health, mining, business sector). There are six electable courses in the second year. Courses in the second year broaden your knowledge in the field and they prepare you for the final thesis.

Swedish for beginners is offered to overseas campus students. The course is not included in the degree and it is followed in addition to the compulsory courses.

### Credits

120 credits

### Degree

- Degree of Master of Science (120 credits) - Major; Computer Science and Engineering with specialisation Applied AI

## Entry requirements

Academic degree of at least 180 higher education credits, of which at least 7.5 credits must include courses in programming and 7,5 credits in chemistry and also 22.5 credits in mathematics. The mathematics skills must include Calculus, Linear Algebra and one course in either Logic or in Statistics.

Good knowledge in English, equivalent to English 6

### Selection

The selection procedure is based on academic qualifications, quality and quantity aspects.

#### Selection group

Academic: 100%

## Compulsory courses

### Compulsory courses 75 credits

Course code	Course	Cr	Level	Comment
D0034E	Applied AI, Knowledge Management and Reasoning	7.5	Bachelor's level	
D0036E	Programming for Machine Learning	7.5	Bachelor's level	
D7041E	Applied Artificial Intelligence	7.5	Master's level	
D7043E	Advanced Data Mining	7.5	Master's level	
D7046E	Neural networks and learning machines	7.5	Master's level	
D7047E	Advanced deep learning	7.5	Master's level	
D7054E	Data Science Programming	7.5	Master's level	
D7062E	Artificial Intelligence and Pattern Recognition	7.5	Master's level	
E7010N	Artificial intelligence and business development	7.5	Master's level	
M7016H	Artificial Intelligence within the Healthcare System	7.5	Master's level	

### Electable courses 15 credits

Selective space is 15 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
D7064E	Neuromorphic Computing	7.5	Master's level	Selectable
D7065E	Embedded Intelligence at the Edge	7.5	Master's level	Selectable
D7068E	Neurochemistry for AI	7.5	Master's level	Selectable
P7002H	Human Cognitive Neuroscience	7.5	Master's level	Selectable
R7010E	Robotics	7.5	Master's level	Selectable
R7020E	Computer Vision and Image Processing	7.5	Master's level	Selectable

### Course offered outside the obligatory courses - not compulsory - For non Scandinavian students 3 credits

Selective space is 3 credits. It is mandatory to select elective courses up to the given number of credits. The given number of credits of elective courses listed must be met for degree.

Course code	Course	Cr	Level	Comment
S0046P	Swedish for International Students 1	3	Bachelor's level	Selectable

## Master thesis 30 credits

Course code	Course	Cr	Level	Comment
X7013E	Master thesis in Artificial Intelligence	30	Master's level	

## Study schedule

### Year of study 1 Enrollment semester Autumn 2024, Is offered in 2024/2025

Study-period	Course code	Course	Cr	Comment
1	D0036E	Programming for Machine Learning	7.5	
1	D7062E	Artificial Intelligence and Pattern Recognition	7.5	
1	S0046P	Swedish for International Students 1	3	Selectable
2	D0034E	Applied AI, Knowledge Management and Reasoning	7.5	
2	E7010N	Artificial intelligence and business development	7.5	
3	D7046E	Neural networks and learning machines	7.5	
3	D7054E	Data Science Programming	7.5	
4	D7047E	Advanced deep learning	7.5	
4	M7016H	Artificial Intelligence within the Healthcare System	7.5	

### Year of study 2 Enrollment semester Autumn 2024, Is offered in 2025/2026, planned study schedule

Study-period	Course code	Course	Cr	Comment
1	D7043E	Advanced Data Mining	7.5	
1	D7065E	Embedded Intelligence at the Edge	7.5	Selectable
1	D7068E	Neurochemistry for AI	7.5	Selectable
1	R7020E	Computer Vision and Image Processing	7.5	Selectable
2	D7041E	Applied Artificial Intelligence	7.5	
2	D7064E	Neuromorphic Computing	7.5	Selectable
2	P7002H	Human Cognitive Neuroscience	7.5	Selectable
2	R7010E	Robotics	7.5	Selectable
3-4	X7013E	Master thesis in Artificial Intelligence	30	Entry requirements