

Master Programme in Artificial Intelligence

Introduction

The Master Programme in Artificial Intelligence aims to train IT professionals who possess advanced theoretical and practical knowledge in the design, development, and application of artificial intelligence methods and systems. During the programme, students acquire modern machine learning and data processing techniques, learn the principles of developing and integrating artificial intelligence systems, and become capable of independently analysing and solving complex problems in or related to the field of artificial intelligence. The programme also prepares students to conduct research and development, create innovative IT systems, and continue their studies in doctoral (PhD) programmes.

Admission

Admission to the Master Programme in Artificial Intelligence is primarily open to graduates of **Computer Engineering, Computer Science, or Business Informatics BSc programmes**. Applicants from other IT-related undergraduate programmes may also apply if they possess the required prior academic credits. At least **50 credits of relevant prior studies** are required to start the programme, of which at least **30 credits must be completed at the time of admission**. Any missing credits may be obtained in parallel with the MSc studies.

Goal

The goal of the Master Programme in Artificial Intelligence is to ensure that graduates are capable of applying modern artificial intelligence methods, developing new algorithms and systems, and using them to solve complex problems in both scientific and industrial environments.

Common Subjects

The MSc programme consists of mathematically grounded professional subjects, theoretical and practical courses in artificial intelligence, as well as individual project work and the preparation of a master's thesis. The professional subjects are complemented by elective courses that allow students to gain deeper knowledge in specific subfields.

Specialization and Elective Subjects

No separate specialization tracks are defined in the programme. However, beyond the unified and comprehensive core artificial intelligence curriculum, elective courses offer students opportunities to deepen their knowledge in areas of interest, such as computer

vision, robotics, human–machine collaboration, multi-agent systems, or industrial applications of artificial intelligence.

Project Subjects

Research-oriented and project-based education plays a central role in the programme. During their studies, students may join departmental research and development projects and develop their own solutions to artificial intelligence problems as part of independent laboratory work. An important element of the programme is the completion of the courses **Independent Laboratory 1** and **Independent Laboratory 2**, during which students demonstrate their ability to apply artificial intelligence methods independently.

Summer Internship

A requirement for obtaining the degree is the successful completion of a **mandatory professional internship of at least six weeks**. During the internship, students gain experience in an industrial or research environment and prepare a written report on the work carried out and the results achieved.

Mobility Window

The programme also provides mobility opportunities: a **mobility window** is designated in the third semester of the model curriculum to facilitate student participation in study periods at foreign universities or the preparation of their master's thesis within the framework of international collaboration.

Master's Thesis and Final Examination

A key element of the programme is the preparation of the **master's thesis**, in which students solve a complex artificial intelligence problem. The thesis demonstrates that the student is capable of independent research and development, including analysing a problem, designing a solution, implementing it, and evaluating the results. The thesis must be written in English and defended before the final examination committee. The **final examination** consists of the defence of the master's thesis and an oral examination in a selected subject.

Curriculum

The programme's curriculum is structured in two versions to allow students to begin their studies in either the spring or the autumn semester. At the same time, except for a few cases, courses do not need to be offered in both semesters. This ensures that students who

complete their BSc studies in seven semesters (i.e., an odd number) can start their MSc studies without having to skip a semester.

a) Start in Spring semester

	Course name	Semester			
		1	2	3	4
Mathematical and Scientific Knowledge (10 ECTS credits)					
1	Mathematical principles of AI (TEMIMSVMIMA-00)	3/0/0/e/5			
2	Advanced probability theory (VISZMSMA001-00)	3/0/0/e/5			
Informatics and Artificial Intelligence Core Material (30 ECTS credits)					
3	Foundation of artificial intelligence (VIMIMSMA001-00)	2/1/0/e/5			
4	Machine learning (VIMIMA27)		2/1/0/e/5		
5	AI technologies (VIAUMSMA001-00)	2/0/1/m/5			
6	AI in practice (VITMMSMA001-00)		2/0/1/m/5		
7	Deep learning (VITMMA19)		2/1/0/e/5		
8	Security of machine learning (VIHIMB09)			2/1/0/e/5	
Knowledge in Artificial Intelligence-related Special Competencies (45 ECTS credits)					
9	AI-based business models				2/0/0/m/3
10	Artificial intelligence and ethics (GT41V105)		2/0/0/m/3		
11	Artificial intelligence and law (GT55V106)			2/0/0/m/3	
12	Compulsory elective subject 1.*	2/1/0/e/5			
13	Compulsory elective subject 2.*		2/1/0/e/5		
14	Compulsory elective subject 3.*			2/1/0/e/5	
15	Compulsory elective subject 4.*			2/1/0/e/5	
16	Compulsory elective subject 5.*				2/1/0/e/5
17	Project laboratory	0/0/3/m/5	0/0/3/m/5		
Diploma work (30 ECTS credits)					
18	Diploma thesis			0/3/0/m/10	0/7/0/m/20
Free elective subject (6 ECTS credits)					
19	Free elective subject 1.		2/0/0/m/2		
20	Free elective subject 2.			2/0/0/m/2	
21	Free elective subject 3.				2/0/0/m/2
Criterion subject (0 ECTS credits)					
22	Mandatory internship	6 weeks/s/0			

Total weekly hours	18	19	16	14
Lecture/practice/laboratory hours	12 / 2 / 4	12 / 3 / 4	10 / 6 / 0	6 / 8 / 0
Total ECTS credits	30	30	30	30
Number of exams	4	3	3	1

Legend: lecture/practice/laboratory/e=exam, m=mid-semester mark, s=signature/ECTS credits

*It is mandatory to complete 25 ECTS credits from the list of compulsory elective subjects.

b) Start in Fall Semester

	Course name	Semester			
		1	2	3	4
Mathematical and Scientific Knowledge (10 ECTS credits)					
1	Mathematical principles of AI (TEMMSVMIMA-00)	3/0/0/e/5			
2	Advanced probability theory (VISZMSMA001-00)		3/0/0/e/5		
Informatics and Artificial Intelligence Core Material (30 ECTS credits)					
3	Foundation of artificial intelligence (VIMMSMA001-00)	2/1/0/e/5			
4	Machine learning (VIMIMA27)		2/1/0/e/5		
5	AI technologies (VIAUMSMA001-00)	2/0/1/m/5			
6	AI in practice (VITMMSMA001-00)	2/0/1/m/5			
7	Deep learning (VITMMA19)			2/1/0/e/5	
8	Security of machine learning (VIHIMB09)		2/1/0/e/5		
Knowledge in Artificial Intelligence-related Special Competencies (45 ECTS credits)					
9	AI-based business models				2/0/0/m/3
10	Artificial intelligence and ethics (GT41V105)		2/0/0/m/3		
11	Artificial intelligence and law (GT55V106)			2/0/0/m/3	
12	Compulsory elective subject 1.*	2/1/0/e/5			
13	Compulsory elective subject 2.*		2/1/0/e/5		
14	Compulsory elective subject 3.*			2/1/0/e/5	
15	Compulsory elective subject 4.*			2/1/0/e/5	
16	Compulsory elective subject 5.*				2/1/0/e/5
17	Project laboratory	0/0/3/m/5	0/0/3/m/5		
Diploma work (30 ECTS credits)					
18	Diploma thesis			0/3/0/m/10	0/7/0/m/20
Free elective subjects (6 ECTS credits)					

19	Free elective subject 1.		2/0/0/m/2		
20	Free elective subject 2.			2/0/0/m/2	
21	Free elective subject 3.				2/0/0/m/2
Criterion subject (0 ECTS credits)					
22	Mandatory internship	6 weeks/s/0			
Total weekly hours					
		18	19	16	14
Lecture/practice/laboratory hours					
		11 / 2 / 5	13 / 3 / 3	10 / 6 / 0	6 / 8 / 0
Total ECTS credits					
		30	30	30	30
Number of exams					
		3	4	3	1

Legend: lecture/practice/laboratory/e=exam, m=mid-semester mark, s=signature/ECTS credits

*It is mandatory to complete 25 ECTS credits from the list of compulsory elective subjects.

c) List of Compulsory Elective Subjects:

Course name	Department
AI assisted software development (VIAUMSMA087-00)	AUT
Development of Artificial Intelligence based Software and Services (VIAUBXAV081-00)	AUT
High performance embedded computing	AUT
Intelligent robots (VIIIMSMA247-00)	IIT
Application of Deep Learning in Visual Computing (VIIIMB10)	IIT
Computer vision systems (VIIIMA19)	IIT
AI-based control and multiagent robot coordination (VIIIMSMA001-00)	IIT
Causal analysis and decision support (VIMIMSMB001-00)	MIT
Thrustworthy AI and Data Analysis (VIMIMB10)	MIT
Integrated large language models (VIMIMSMB002-00)	MIT-TMIT
Data science on structured and textual data (VITMMSMA002-00)	TMIT
UX&AI (VITMMSMA003-00)	TMIT
Advanced machine learning (VITMMSMB001-00)	TMIT-MIT
AI-based optimization and anomaly detection (VIHIMSMB001-00)	HIT
Hardware-in-the-loop AI image processing	GPK
AI in manufacturing	GPK