



Data Science MSc curriculum – 2023

**Debrecen
2024/2025.**

DATA SCIENCE MSc CURRICULUM

Qualification requirements

General requirements of the diploma are regulated by The Rules and Regulations of The University of Debrecen.

Work and Fire Safety and Physical Education

The courses of „Work and Fire Safety" and „Physical Education" are worth 1 - 1 credit, which must be completed in excess of the number of credits required for the diploma as specified in the training and outcome requirements of the degree.

Diploma credit requirements:

Basic knowledge related to the theoretical background of data science:	24 credits
Basic skills related to the practical background of data science:	15 credits
Differentiated knowledge topics:	45 credits
Professional Training:	9 credits
Thesis work:	30 credits
Free choice:	6 credits
Total	120 credits
Work and Fire Safety Training:	1 credit
Physical Education (1 semester):	1 credit

Basic knowledge related to the theoretical background of data science – needed 24 credits

Code	Subject name	Credit	Type and number			Assessment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA0101-23 INMAA0101E INMAA0101L	Information Security	6	2		2	E S			1
INMAA0102-23 INMAA0102E INMAA0102L	Fundamentals of Machine Learning	6	2		2	E S			1
INMAA0103-23 INMAA0103E INMAA0103L	Statistics for Data Science	6	2		2	E S			1
INMAA0207-23 INMAA0207E INMAA0207L	Optimization for Data Science	6	2		2	E S			2

**Basic skills related to the practical background of data science –
needed 15 credits**

Code	Subject name	Credit	Type and number			Assessment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA0104-23 INMAA0104E INMAA0104L	Cloud Computing	6	2		2	E S			1
INMAA0105-23 INMAA0105L	Data Visualization Methods	3			2	PM			1
INMAA0106-23 INMAA0106L	Programming for Data Science	3			2	PM			1
INMAA0208-23 INMAA0208E	Data Ethics	3	2			E			2

Thesis work – needed 30 credits

Code	Subject name	Credit	Type and number			Assessment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA0309-23 INMAA0309G	Thesis 1	15				PM			3
INMAA0410-23 INMAA0410G	Thesis 2	15				PM			4

Differentiated knowledge topics – needed 45credits

Advanced Machine Learning block

Code	Subject name	Credit	Type and number			Assessment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9911-23 INMAA9911E INMAA9911L	Advanced Natural Language Processing	6	2		2	PM			2
INMAA9916-23 INMAA9916E INMAA9916L	Social and Technological Networks	6	2		2	E S			3
INMAA9917-23 INMAA9917L	Modern Deep Learning Frameworks	3			2	PM	INMAA0106		3
INMAA9918-23 INMAA9918L	Generative Networks	3			2	PM			3
INMAA9932-23 INMAA9932E INMAA9932L	Advanced Machine Learning	6	2		2	E S	INMAA0102		4
INMAA9933-23 INMAA9933E INMAA9933L	Advanced Reinforcement Learning	6	2		2	PM	INMAA0102		4

Machine Learning System Design block

Code	Subject name	Credit	Type and number			Asses-ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9912-23 INMAA9912E INMAA9912L	Docker and Kubernetes in ML	6	2		2	PM		2	
INMAA9919-23 INMAA9919E INMAA9919L	Extreme Computing	6	2		2	E S		3	
INMAA9920-23 INMAA9920E INMAA9920L	Design of Big Data Systems	6	2		2	E S	INMAA0104	3	
INMAA9921-23 INMAA9921L	Big Data Technologies	3			2	PM	INMAA0106	3	

AI in Industry block

Code	Subject name	Credit	Type and number			Asses-ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9913-23 INMAA9913L	Geometric Data Analysis	3			2	PM		2	
INMAA9914-23 INMAA9914L	Processing Large Amounts of Sensor Data	3			2	PM		2	
INMAA9922-23 INMAA9922E INMAA9922L	Advanced robotics	6	2		2	E S		3	
INMAA9923-23 INMAA9923E INMAA9923L	Autonomous Vehicles	6	2		2	PM		3	
INMAA9924-23 INMAA9924E INMAA9924L	Theoretical and Neural Models in the Industry	6	2		2	PM	INMAA0102	3	
INMAA9925-23 INMAA9925L	Parallel computing with CUDA	3			2	PM		3	

Security block

Code	Subject name	Credit	Type and number			Asses-ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9926-23 INMAA9926E INMAA9926L	Cryptography	6	2		2	E S		3	
INMAA9927-23 INMAA9927E INMAA9927L	AI Security	6	2		2	PM	INMAA0101 INMAA0102	3	
INMAA9934-23 INMAA9934E INMAA9934L	Secure Coding	6	2		2	PM		4	

Stochasticity block

Code	Subject name	Credit	Type and number			Asses- ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9928-23 INMAA9928E INMAA9928L	Time Series Analysis	6	2		2	E S			3
INMAA9929-23 INMAA9929E INMAA9929L	Financial Modelling	6	2		2	PM			3
INMAA9930-23 INMAA9930E INMAA9930L	Stochastic Data Mining	6	2		2	E S			3

AI in Medicine block

Code	Subject name	Credit	Type and number			Asses- ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9915-23 INMAA9915E INMAA9915L	Clinical Big Data	6	2		2	E S			2
INMAA9931-23 INMAA9931E INMAA9931L	Genetics and BigData	6	2		2	E S			3

Professional Training

Code	Subject name	Credit	Type and number			Asses- ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				
INMAA9997-23 INMAA9997G	Professional Training	9				PM			3

Free choice – needed 6 credits

Code	Subject name	Credit	Type and number			Asses- ment	Prerequisites	Period	Semester
			lec.	practice					
				sem.	lab				

Exam types: E exam
S signature
PM practical mark