National Research University Higher School of Economics (HSE)

Curriculum
Field of study 01.04.02 Applied Mathematics and Informatics
Educational Programme "Modern Computer Science"
Trajectories: "Artificial Intelligence", "Theoretical Computer Science"
Implementing unit: Faculty of Computer Science, HSE - Moscow
1 st, 2024/2025 academic year

Length of Programme: 2 years
Years of Study: 2024/2025 - 2025/2026
Mode of Study: Full Time
Degree: Master's degree / MBA

Block Code	Course	Subject type	Department	Credits	Total Academic Hours	Contact Hours	Allocation of Contact Hours				Additional Information
							1	2	3	4	
	Degree Programme			**60,00**	**2 280**	**578**	**144**	**144**	**144**	**146**	
	Artificial Intelligence (General track)			**60,00**	**2 280**	**578**	**144**	**144**	**144**	**146**	
	Major			**45,00**	**1 710**	**544**	**136**	**136**	**136**	**136**	
	1st year			**45,00**	**1 710**	**544**	**136**	**136**	**136**	**136**	
1	Algorithms in External Memory	E	Joint Department with Yandex	6,00	228	56	28	28A			
2	Algorithms and Data Structures 1	E	Joint Department with Yandex	6,00	228	56	28	28A			
3	Algorithms and Data Structures 2	E	Joint Department with Yandex	6,00	228	80			40	40A	
4	Computer Architecture and Operating Systems	E	Joint Department with Yandex	6,00	228	56	28	28A			
5	Generative Models in Machine Learning	E	Department of Big Data and Information Retrieval	3,00	114	40			40A		
6	Deep Vision and Graphics	E	Joint Department with Yandex	6,00	228	56	28	28A			
7	Graphs in Machine Learning	E	Joint Department with Yandex	6,00	228	80			40	40A	
8	Machine Learning 1	E	Joint Department with Yandex	6,00	228	56	28	28A			
9	Machine Learning 2	E	Joint Department with Yandex	6,00	228	80			40	40A	
10	Reinforcement Learning	E	Joint Department with Yandex	6,00	228	80			40	40A	
11	C++ Programming Language 1	E	Joint Department with Yandex	6,00	228	56	28	28A			
12	Learning C++ 2	E	Joint Department with Yandex	6,00	228	80			40	40A	
13	Machine Learning Systems Design	E	Joint Department with Yandex	3,00	114	40				40A	
14	Recommender Systems	E	Joint Department with Yandex	3,00	114	40				40A	
15	Speech Technologies	E	Joint Department with Yandex	6,00	228	80			40	40A	
16	Data Collection and Labeling for Machine Learning	E	Joint Department with Yandex	3,00	114	28		28A			
17	Transformers and LLMs	E	Joint Department with Yandex	3,00	114	40			40A		

#	Course	Type	Department	Credits	Hours					
18	Effective Machine Learning Models and Neural Network Architectures	E	Joint Department with Yandex	3,00	114	40				40A
19	Efficient Deep Learning Systems	E	Joint Department with Yandex	6,00	228	80			40	40A
20	Python	E	Joint Department with Yandex	6,00	228	56	28	28A		
	Key Seminars			**6,00**	**228**	**32**	**8**	**8**	**8**	**8**
1	Mentor's Seminar "Artificial Intelligence"	C	Joint Department with Yandex	6,00	228	32	8	8	8	8A
	Magolego			**6,00**	**228**					
1	All-university Pool MAGOLEGO Courses	E		6,00	228					
	Internship			**3,00**	**114**	**2**				**2**
	Project Internship			**3,00**	**114**	**2**				**2**
1	Project	C		3,00	114	2				2A
	Theoretical Computer Science (General track)			**60,00**	**2 280**	**578**	**144**	**144**	**144**	**146**
	Major			**45,00**	**1 710**	**544**	**136**	**136**	**136**	**136**
	1st year			**45,00**	**1 710**	**544**	**136**	**136**	**136**	**136**
1	Algorithmic Game Theory	E	Department of Big Data and Information Retrieval	6,00	228	56	28	28A		
2	Algorithms and Data Structures 1	E	Joint Department with Yandex	6,00	228	56	28	28A		
3	Algorithms and Data Structures 2	E	Joint Department with Yandex	6,00	228	80			40	40A
4	Convex Analysis and Optimization	E	Joint Department with Yandex	6,00	228	56	28	28A		
5	Combinatorial Constructions in Theoretical Computer Science	E	Department of Big Data and Information Retrieval	6,00	228	80			40	40A
6	Lattice-Based Cryptography	E	Department of Big Data and Information Retrieval	3,00	114	40				40A
7	A Theorist's Toolkit	E	Department of Big Data and Information Retrieval	3,00	114	40			40A	
8	Fundamentals of Matrix Computations	E	Department of Big Data and Information Retrieval	6,00	228	80			40	40A
9	Industrial Programming in Haskell 1	E	Department of Big Data and Information Retrieval	3,00	114	40			40A	
10	Industrial Programming in Haskell 2	E	Department of Big Data and Information Retrieval	3,00	114	40				40A
11	Theory of Computation	E	Department of Big Data and Information Retrieval	6,00	228	56	28	28A		
12	Game Theory	E	Joint Department with Yandex	6,00	228	56	28	28A		
13	Types and Programming Languages	E	Department of Big Data and Information Retrieval	6,00	228	56	28	28A		
14	Topological data analysis	E	Department of Big Data and Information Retrieval	6,00	228	80			40	40A
	Key Seminars			**6,00**	**228**	**32**	**8**	**8**	**8**	**8**
1	Mentor's Seminar "Theoretical Informatics"	C	Department of Big Data and Information Retrieval	6,00	228	32	8	8	8	8A
	Magolego			**6,00**	**228**					
1	All-university Pool MAGOLEGO Courses	E		6,00	228					
	Internship			**3,00**	**114**	**2**				**2**

	Project Internship			**3,00**	**114**	**2**				**2**	
1	Project	C		3,00	114	2				2A	

Curriculum agreed:

Academic Supervisor   Khuzieva A.E.   12.04.2024

Dean   ARZHANTSEV I.V.   12.04.2024

Head of Centre for
 Educational Model Design   LEPESHKIN I.A.   12.04.2024

* Subject type:
Compulsory course   C
Elective course   E