



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 01.04.02 Applied Mathematics and Informatics

Educational Programme "Modern Computer Science"

Trajectories: "Data Science", "Theoretical Computer Science"

Implementing unit: Faculty of Computer Science, HSE - Moscow

APPROVED

29.05.2023

Vice Rector

ROSHCHIN S.Y.

Signed with EDS

Years of Study: 2023/2024 - 2024/2025

Length of Programme: 2 years

Mode of Study: Full Time

Degree: Master's degree / MBA

Block Code	Course	Subject type	Credits	Credits by Years		Planned Educational Programme Development Results
				1	2	
	Degree Programme		120,00	60,00	60,00	
	Data Science (General track)		120,00	60,00	60,00	
	Key Seminars		15,00	6,00	9,00	
1	Mentor's Seminar "Data Science"	C	15,00	6,00	9,00	GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Internship		24,00	3,00	21,00	
	Project Internship		3,00	3,00		
1	Project	C	3,00	3,00		GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3
	Research Internship		21,00		21,00	
1	Graduation Thesis	C	21,00		21,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Major		63,00	45,00	18,00	
	1 year 1 semester		24,00	24,00		
1	Algorithms and Data Structures 1	E	6,00	6,00		GPC-4.AMI, PC-11, UC-2
2	Algorithms in External Memory	E	6,00	6,00		GPC-2.AMI, PC-12, PC-8, UC-2
3	C++ Programming Language, Part 1	E	6,00	6,00		GPC-4.AMI, PC-10, PC-2, UC-6

4	Computer Vision	E	6,00	6,00		GPC-4.AMI, PC-3, PC-7, UC-3
5	Python	E	6,00	6,00		GPC-4.AMI, PC-10, PC-2, UC-2
6	Natural Language Processing	E	6,00	6,00		GPC-4.AMI, PC-10, PC-13, PC-2, UC-3
7	Deep Vision and Graphics	E	6,00	6,00		GPC-4.AMI, PC-6, PC-7, UC-2
	1 year 2 semester		21,00	21,00		
1	Reinforcement Learning	E	6,00	6,00		GPC-4.AMI, PC-4, PC-5, PC-7, UC-2
2	Recommender Systems	E	3,00	3,00		GPC-4.AMI, PC-1, PC-11, PC-7, UC-4
3	Efficient Deep Learning Systems	E	6,00	6,00		GPC-4.AMI, PC-12, PC-3, PC-7, UC-2
4	Algorithms and Data Structures 2	E	6,00	6,00		GPC-1.AMI, PC-10, UC-2
5	Learning C++ 2	E	6,00	6,00		GPC-4.AMI, PC-12, UC-2
6	Speech Technologies	E	6,00	6,00		GPC-4.AMI, PC-9, UC-2
7	Generative Models, Part 2	E	3,00	3,00		GPC-4.AMI, PC-5, PC-7, UC-2, UC-6
	course 2		18,00		18,00	
1	Game Theory	E	6,00		6,00	GPC-2.AMI, PC-2, PC-7, UC-1
2	Bayesian Methods for Machine Learning	E	6,00		6,00	GPC-4.AMI, PC-5, PC-7, UC-2
3	Deep Learning for Graph Data Analysis	E	6,00		6,00	GPC-2.AMI, PC-6, PC-7, PC-8, UC-2
4	Natural Language Processing	E	6,00		6,00	GPC-2.AMI, PC-2, PC-3, PC-6, PC-7, UC-1
5	Computer Vision	E	6,00		6,00	GPC-2.AMI, PC-2, PC-6, PC-7, UC-4
6	Modern System Programming in Rust	E	6,00		6,00	GPC-4.AMI, PC-2, UC-2
7	Distributed Systems	E	6,00		6,00	GPC-1.AMI, PC-11, PC-6, PC-7, UC-2
8	Performance and Reliability of Distributed Systems	E	6,00		6,00	GPC-1.AMI, PC-11, PC-2, PC-7, UC-3
	Magolego		15,00	6,00	9,00	
1	All-university Pool MAGOLEGO Courses	E	15,00	6,00	9,00	GPC-4.AMI, PC-5, UC-1, UC-5, UC-6
	Final State Certification (FSC)		3,00		3,00	
1	Final Qualification Paper	C	3,00		3,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Theoretical Computer Science (General track)		120,00	60,00	60,00	
	Key Seminars		15,00	6,00	9,00	
1	Mentor's Seminar "Theoretical Informatics"	C	15,00	6,00	9,00	GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Internship		24,00	3,00	21,00	
	Project Internship		3,00	3,00		
1	Project	C	3,00	3,00		GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4

	Research Internship		21,00		21,00	
1	Graduation Thesis	C	21,00		21,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Major		63,00	45,00	18,00	
	1 year 1 semester		24,00	24,00		
1	Algorithms and Data Structures 1	E	6,00	6,00		GPC-4.AMI, PC-11, UC-2
2	Game Theory	E	6,00	6,00		GPC-4.AMI, PC-7, UC-2
3	Introduction to Applied Cryptography, Part 1	E	6,00	6,00		GPC-4.AMI, PC-4, PC-7, UC-2
4	Information Theory	E	6,00	6,00		GPC-4.AMI, PC-14, UC-2
5	Theory of Algorithms	E	6,00	6,00		GPC-4.AMI, PC-14, PC-6, UC-2
6	Type Theory	E	6,00	6,00		GPC-4.AMI, PC-14, PC-5, UC-2
7	Algorithmic Game Theory	E	6,00	6,00		GPC-4.AMI, PC-6, PC-8, UC-2
	1 year 2 semester		21,00	21,00		
1	Algorithms and Data Structures 2	E	6,00	6,00		GPC-1.AMI, PC-10, UC-2
2	Introduction to Applied Cryptography, Part 2	E	6,00	6,00		GPC-4.AMI, PC-5, PC-8, UC-2
3	Combinatorial Constructions in Theoretical Computer Science	E	6,00	6,00		GPC-4.AMI, PC-14, UC-1
4	Approximation Algorithms, Convex Programming	E	3,00	3,00		GPC-4.AMI, PC-13, PC-2, UC-2
5	Fundamentals of Matrix Computations	E	6,00	6,00		GPC-2.AMI, PC-14, PC-5, UC-2
6	Lattice-Based Cryptography	E	3,00	3,00		GPC-4.AMI, PC-12, PC-14, PC-8, UC-1
7	Industrial Programming in Haskell, Part 1	E	3,00	3,00		GPC-4.AMI, PC-13, PC-2, UC-2
	course 2		18,00		18,00	
1	Algorithmic Game Theory	E	6,00		6,00	GPC-2.AMI, PC-12, PC-5, UC-3
2	Foundations of Tensor Computations	E	6,00		6,00	GPC-2.AMI, PC-1, PC-14, UC-3
3	One-Way Functions and Their Applications	E	6,00		6,00	GPC-4.AMI, PC-6, PC-7, PC-9, UC-2
4	Information Theory	E	6,00		6,00	GPC-1.AMI, PC-13, PC-14, UC-1
5	Introduction to Applied Cryptography	E	6,00		6,00	GPC-2.AMI, PC-14, PC-6, UC-2
6	Introduction to Functional Analysis	E	6,00		6,00	GPC-1.AMI, PC-5, PC-6, UC-1
7	Generative Artificial Intelligence	E	6,00		6,00	GPC-2.AMI, PC-12, PC-2, PC-4, PC-8, PC-9, UC-3
	Magolego		15,00	6,00	9,00	
1	All-university Pool MAGOLEGO Courses	E	15,00	6,00	9,00	GPC-4.AMI, PC-5, UC-1, UC-5, UC-6
	Final State Certification (FSC)		3,00		3,00	
1	Final Qualification Paper	C	3,00		3,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-10, PC-11, PC-12, PC-13, PC-14, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6

Curriculum agreed:

Academic Supervisor	Khuzieva A.E.	26.05.2023
Dean	ARZHANTSEV I.V.	26.05.2023
Head of Centre for Educational Model Design	LEPESHKIN I.A.	26.05.2023

* Subject type:

Compulsory course	C
Elective course	E