



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 01.04.02 Applied Mathematics and Informatics

Educational Programme "Math of Machine Learning"

Trajectories: "Math of Machine Learning"

Implementing unit: Faculty of Computer Science, HSE - Moscow

APPROVED

23.05.2023

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	
	Math of Machine Learning (General track)		120,00	60,00	60,00	
	Key Seminars		15,00	6,00	9,00	
1	Mentor's Seminar "Math of Machine Learning " (offered in a foreign language)	C	15,00	6,00	9,00	GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, UC-2, UC-3, UC-4
	Internship		30,00	6,00	24,00	
	Project Internship		6,00	6,00		
1	Innovation Workshop (offered in a foreign language)	C	6,00	6,00		GPC-2.AMI, GPC-4.AMI, PC-1, PC-3, PC-5, PC-6, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Research Internship		24,00		24,00	
1	Graduation Thesis (offered in a foreign language)	C	24,00		24,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6
	Major		69,00	48,00	21,00	
	Basic part. 1 year		27,00	27,00		
1	Additional Topics in Probability Theory (offered in a foreign language)	C	3,00	3,00		GPC-1.AMI, PC-6, UC-6
2	Machine Learning (offered in a foreign language)	C	6,00	6,00		GPC-2.AMI, GPC-3.AMI, PC-1, PC-2, PC-3, PC-4, PC-5, UC-6
3	Computational Linear Algebra (offered in a foreign language)	C	6,00	6,00		GPC-1.AMI, PC-3, UC-6

4	High Dimensional Probability and Statistics (offered in a foreign language)	C	6,00	6,00		GPC-2.AMI, PC-3, UC-6
5	Markov Chains (offered in a foreign language)	C	6,00	6,00		GPC-1.AMI, PC-1, PC-2, UC-6
Elective Courses. 1 year			21,00	21,00		
1	Introduction to Data Analysis (offered in a foreign language)	E	3,00	3,00		GPC-3.AMI, PC-4, UC-2
2	Convex Optimization and Applications (offered in a foreign language)	E	3,00	3,00		GPC-1.AMI, PC-3, UC-6
3	Introduction to Computer Vision (offered in a foreign language)	E	3,00	3,00		GPC-2.AMI, PC-2, PC-4, UC-3
4	Deep Learning (offered in a foreign language)	E	6,00	6,00		GPC-4.AMI, PC-1, PC-4, UC-2, UC-6
5	Introduction to Natural Language Processing (offered in a foreign language)	E	3,00	3,00		GPC-3.AMI, PC-2, PC-3, UC-3
6	Theoretical Methods of Deep Learning (offered in a foreign language)	E	3,00	3,00		GPC-3.AMI, PC-3, UC-6
7	Computational Imaging (offered in a foreign language)	E	3,00	3,00		GPC-2.AMI, PC-1, PC-4, PC-6, UC-2
Elective Courses. 2 year			21,00		21,00	
1	Bayesian Methods for Machine Learning	E	6,00		6,00	GPC-4.AMI, PC-1, PC-3, PC-5, UC-6
2	Mathematical Foundations of Reinforcement learning	E	3,00		3,00	GPC-1.AMI, GPC-2.AMI, PC-3, PC-6, UC-6
3	Generative Models in Machine Learning	E	3,00		3,00	GPC-4.AMI, PC-5, PC-6, UC-2, UC-6
4	Theoretical Methods of Deep Learning	E	3,00		3,00	GPC-2.AMI, GPC-3.AMI, PC-2, PC-5, UC-6
5	Machine Learning 2	E	6,00		6,00	GPC-4.AMI, PC-3, PC-4, UC-1, UC-6
6	Bayesian Methods for Neural Networks	E	6,00		6,00	GPC-2.AMI, GPC-4.AMI, PC-2, PC-5, UC-6
Final State Certification (FSC)			6,00		6,00	
1	Final Qualification Paper (offered in a foreign language)	C	6,00		6,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6

Curriculum agreed:

Academic Supervisor NAUMOV A.A. 05.05.2023

Dean ARZHANTSEV I.V. 05.05.2023

Head of Centre for Educational Model Design LEPESHKIN I.A. 23.05.2023

* Subject type:

Compulsory course

C

Elective course

E