



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 01.03.02 Applied Mathematics and Information Science
Educational Programme "Applied Mathematics and Information Science"

Specializations: "Data Analysis and Intelligent Systems", "Decision Choice and Analysis", "Distributed Systems", "Industrial Software Engineering",
"Machine Learning and Applications", "Mathematical and Computational Engineering in Science and Business", "Theoretical Computer Science"

Implementing unit: Faculty of Computer Science, HSE - Moscow

Years of Study: 2021/2022 - 2024/2025

Length of Programme: 4 years

Mode of Study: Full Time

Degree: Bachelor's degree

APPROVED
12.04.2021
Vice Rector
ROSHCHIN S.Y.
Signed with EDS

Block Code	Course	Subject type	Credits	Credits by Years				Planned Educational Programme Development Results
				1	2	3	4	
	Degree Programme		241,00	60,00	60,00	60,00	61,00	
	Major		167,00	48,00	44,00	38,00	37,00	
	Core Professional Block (Major)		85,00	48,00	31,00	6,00		
	Subject Areas		85,00	48,00	31,00	6,00		
	Discrete Mathematics		7,00	7,00				
	Дискретная математика		7,00	7,00				
1	Discrete Mathematics	C	7,00	7,00				GPC-2, GPC-4, PC-1, UC-3, UC-5
2	Discrete Mathematics (Advanced Course)	C	7,00	7,00				GPC-2, GPC-4, PC-1, UC-5
	Linear Algebra and Geometry		13,00	13,00				
	Линейная алгебра и геометрия		10,00	10,00				
1	Linear Algebra and Geometry	C	10,00	10,00				GPC-1, GPC-4, PC-1, UC-3, UC-5
2	Linear Algebra and Geometry (Advanced Course)	C	10,00	10,00				GPC-1, GPC-4, PC-1, UC-3, UC-5
	Алгебра		3,00	3,00				
1	Algebra	C	3,00	3,00				GPC-1, GPC-4, PC-1, UC-3, UC-5
2	Algebra (Advanced Course)	C	3,00	3,00				GPC-1, GPC-4, PC-1, UC-3, UC-5
	Mathematical Analysis		18,00	10,00	8,00			
	Математический анализ		10,00	10,00				
1	Calculus	C	10,00	10,00				GPC-1, GPC-2, GPC-3, UC-3, UC-5, UC-6
2	Calculus (Advanced Course)	C	10,00	10,00				GPC-1, GPC-2, GPC-3, UC-3, UC-5, UC-6
	Математический анализ 2		8,00		8,00			
1	Calculus 2	E	8,00		8,00			GPC-1, GPC-3, PC-1, UC-1, UC-2

2	Calculus 2	E	8,00		8,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
	Probability Theory and Mathematical Statistics		10,00		10,00			
	Probability Theory		5,00		5,00			
1	Probability Theory	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
2	Probability Theory (advanced course)	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
	Mathematical Statistics		5,00		5,00			
1	Mathematical Statistics (advanced course)	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
2	Mathematical Statistics	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
	Programming		9,00	9,00				
	Основы и методология программирования		9,00	9,00				
1	Introduction to Programming	C	9,00	9,00				GPC-4, PC-1, PC-5, UC-3, UC-5
2	Introduction to Programming	C	4,00	4,00				GPC-4, PC-1, PC-3, UC-3, UC-5
	Algorithms and Data Structures		13,00	9,00	4,00			
	Алгоритмы и структуры данных		9,00	9,00				
1	Algorithms and Data Structures	C	9,00	9,00				GPC-4, PC-1, PC-2, UC-3, UC-5
2	Algorithms and Data Structures	C	14,00	14,00				GPC-4, PC-1, PC-2, UC-3, UC-5
	Алгоритмы и структуры данных 2		4,00		4,00			
1	Algorithms and Data Structures 2	E	4,00		4,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
2	Algorithms and Data Structures 2	E	4,00		4,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
	Optimization Methods		6,00			6,00		
	Методы оптимизации		6,00			6,00		
1	Optimization Methods	E	6,00			6,00		GPC-1, GPC-2, GPC-3, PC-1, PC-3, UC-1, UC-2
2	Optimization in Machine Learning	E	6,00			6,00		GPC-1, GPC-2, GPC-3, PC-1, PC-3, UC-1, UC-2
3	Combinatorial Optimization	E	6,00			6,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
	Computer Architecture and Operating Systems		9,00		9,00			
1	Computer Architecture and Operating Systems	C	9,00		9,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-2, PC-3, UC-1, UC-2, UC-3, UC-5
	Elective Professional Block (Major)		82,00		13,00	32,00	37,00	
	Обязательная дисциплина по выбору (2 курс 2 семестр)		5,00		5,00			
1	Differential Equations	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
2	Fundamentals of Matrix Computations	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
	Специализации		38,00			15,00	23,00	
	-		38,00			15,00		
1	Fault-tolerant System Design	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
2	Fault-tolerant System Design 2	C	6,00			6,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2

3	Project Seminar "Software Engineering"	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
4	Systems Reliability Engineering	C	5,00				5,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
5	Systems Reliability Engineering 2	C	4,00				4,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
6	-	E	5,00				5,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
7	-	E	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
8	Project Seminar "Software Engineering 2"	C	5,00				5,00	GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
	Специализация "Машинное обучение и приложения"		38,00			15,00	23,00	
1	Machine Learning 2	C	6,00			6,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
2	Research Seminar "Machine Learning and Applications"	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
3	Applied Statistical Data Analysis	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
4	-	E	5,00				5,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
5	-	E	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
6	Deep Learning 2	C	5,00				5,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
7	Large-Scale Machine Learning	C	4,00				4,00	GPC-4, PC-1, PC-3, UC-3, UC-5
8	Research Seminar "Machine Learning and Applications 2"	C	5,00				5,00	GPC-2, PC-1, PC-7, UC-4, UC-5
	Специализация "Теоретическая информатика"		34,00			15,00	19,00	
1	Theory of Computation (offered in a foreign language)	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
2	Combinatorial Constructions in Theoretical Computer Science	C	6,00			6,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
3	Research Seminar "Theoretical Informatics"	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
4	-	E	5,00				5,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
5	-	E	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
6	One-Way Functions and Their Applications	C	5,00				5,00	
7	Research Seminar "Theoretical Informatics 2"	C	5,00				5,00	GPC-2, PC-1, PC-7, UC-4, UC-5
	Специализация "Анализ данных и интеллектуальные системы"		38,00			15,00	23,00	
1	Core Concepts in Data Analysis	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2

2	Combinatorics, Graphs and Boolean Logic (offered in a foreign language)	C	6,00			6,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
3	Research Seminar "Data Analysis and Artificial Intelligence" (offered in a foreign language)	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
4	Automatic Text Processing	C	5,00				5,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
5	Applied Graph Theory (offered in a foreign language)	C	5,00				5,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
6	Semantic Technologies (offered in a foreign language)	C	4,00				4,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
7	Analysis and Visualization of Networks (offered in a foreign language)	C	4,00				4,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
8	Research Seminar "Data Analysis and Artificial Intelligence 2"	C	5,00				5,00	GPC-4, PC-1, PC-2, PC-6, UC-3
	Специализация "Распределенные системы"		34,00			15,00	19,00	
1	Theory and Practice of Concurrency	C	6,00			6,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
2	Distributed Systems	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
3	Research Seminar "Distributed Systems"	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
4	Methods and Systems for Processing Big Data	C	5,00				5,00	GPC-4, PC-1, PC-3, UC-3, UC-5
5	Theory of Fault-Tolerant Distributed Systems	C	5,00				5,00	GPC-4, PC-1, PC-3, UC-3, UC-4
6	Cloud Computing	C	4,00				4,00	GPC-4, PC-1, PC-3, UC-3, UC-5
7	Research Seminar "Distributed Systems 2"	C	5,00				5,00	GPC-2, PC-1, PC-7, UC-4, UC-5
	Специализация "Анализ и принятие решений"		38,00			15,00	23,00	
1	Choice and Decision Theory (offered in a foreign language)	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
2	Research Seminar "Applied Problems of Decision Making"	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3
3	Operations Research and Game Theory (offered in a foreign language)	C	6,00			6,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
4	Systems Analysis (offered in a foreign language)	C	5,00				5,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
5	Individual and Social Choice (offered in a foreign language)	C	5,00				5,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
6	Cooperative Games (offered in a foreign language)	C	4,00				4,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
7	Time Series and Stochastic Processes (offered in a foreign language)	C	4,00				4,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
8	Research Seminar "Applied Problems of Decision Making 2" (offered in a foreign language)	C	5,00				5,00	GPC-2, PC-1, PC-7, UC-4, UC-5
	Специализация "Математическая инженерия в науке и бизнесе"		35,00			15,00	20,00	
1	Research Seminar "Mathematical and Computational Engineering in Science and Business" (offered in a foreign language)	C	4,00			4,00		GPC-1, PC-1, PC-4, PC-5, UC-1, UC-2, UC-3

2	-	E	5,00			5,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
3	-	E	4,00			4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
4	Applied Differential Equations and Numerical Methods	C	5,00		5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
5	Control Theory and Foundations of Robotics	C	6,00		6,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
6	Complex Systems Theory	C	5,00			5,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
7	Stochastic Calculus	C	6,00			6,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
Обязательная дисциплина на 3 курсе			6,00		6,00		
1	Machine Learning 1	C	6,00		6,00		GPC-2, GPC-4, PC-1, UC-3, UC-5
Дисциплины по выбору (Блок 1)			5,00		5,00		
1	Computer Systems Security	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
2	Bioinformatics	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
3	Foundations of Tensor Computations	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
4	Applied Statistical Data Analysis	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
5	Decision Making under Risk and Uncertainty	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
6	Data Collection and Labeling for Machine Learning	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
7	Statistical Learning Theory (offered in a foreign language)	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
8	Functional Programming	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
9	SQL Language	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
10	Developing Microservices with Golang	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
11	Data management in intelligent systems (offered in a foreign language)	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
12	Distributed Systems	E	5,00		5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, UC-1, UC-2
13	Management Consulting Ffor Business: Basic Skills, Industry and Functional Expertise	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
14	Scala Programming Language	E	5,00		5,00		GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
15	Database Systems	E	5,00		5,00		GPC-1, GPC-4, PC-2, PC-3, PC-7, UC-1
16	Operating Systems 2	E	5,00		5,00		GPC-1, GPC-4, PC-3, PC-7, UC-1

17	Types and Programming Languages	E	5,00			5,00	GPC-1, GPC-4, PC-1, PC-2, PC-3, PC-7, UC-1
	Дисциплины по выбору (Блок 2)		6,00			6,00	
1	Chapters in Applied Statistics	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
2	Combinatorial Optimization	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
3	Machine Learning 2	E	6,00			6,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, UC-1, UC-2
4	Time Series Modeling	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
5	Java Programming	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
6	Data Analysis in Business	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
7	Topological data analysis	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
8	Recommender Systems	E	6,00			6,00	GPC-2, GPC-3, PC-1, UC-1, UC-2
9	Stochastic Calculus	E	6,00			6,00	GPC-1, GPC-3, PC-1, UC-1, UC-2
10	Color Computational Photography	E	6,00			6,00	
11	Computer Networks	E	6,00			6,00	GPC-1, GPC-4, PC-2, PC-3, PC-7, UC-1
12	Generative Models in Machine Learning (advanced course)	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, PC-2, UC-1
13	Deep Learning Methods in Natural Sciences	E	6,00			6,00	GPC-1, GPC-2, GPC-3, PC-1, PC-2, UC-1
14	Linguistics for Programmers	E	6,00			6,00	GPC-1, PC-1, PC-4, UC-1
15	Data Analytics	E	6,00			6,00	GPC-1, GPC-4, PC-1, PC-3, PC-7, UC-1, UC-3, UC-4
16	Quantitative Finance	E	6,00			6,00	GPC-1, GPC-4, PC-1, PC-3, PC-7, UC-1, UC-3, UC-4
17	Process-mining	E	6,00			6,00	GPC-1, GPC-4, PC-1, PC-3, PC-7, UC-1, UC-3, UC-4
18	Machine learning in applied problems	E	6,00			6,00	GPC-1, GPC-4, PC-1, PC-3, PC-7, UC-1, UC-3, UC-4
	Обязательная дисциплина по выбору (4 курс)		5,00			5,00	
1	DevOps (offered in a foreign language)	E	5,00			5,00	GPC-2, GPC-4, PC-1, UC-3, UC-5
2	How to Win a Data Science Competition: Learn from Top Kagglers (offered in a foreign language)	E	5,00			5,00	GPC-2, GPC-4, PC-1, UC-3, UC-5
3	Introduction to Differential Geometry (offered in a foreign language)	E	5,00			5,00	GPC-2, GPC-4, PC-1, UC-3, UC-5
	Дисциплины по выбору (Блок 3)		5,00			5,00	
1	Bayesian Methods for Machine Learning	E	5,00			5,00	GPC-3, GPC-4, PC-1, UC-3, UC-5
2	Foundations of Tensor Computations	E	5,00			5,00	
3	Operating Systems 2	E	5,00			5,00	
4	Types and Programming Languages	E	5,00			5,00	

5	Computer Systems Security	E	5,00				5,00	
6	Statistical Learning Theory (offered in a foreign language)	E	5,00				5,00	GPC-1, PC-1, PC-5, UC-2, UC-5
7	Deep Learning for Sound Processing	E	5,00				5,00	
8	Deep Learning for Natural Language Processing	E	5,00				5,00	
9	Systems Design	E	5,00				5,00	
10	Deep Learning for Graph Data Analysis	E	5,00				5,00	
11	Scala Programming Language	E	5,00				5,00	
	Дисциплины по выбору (Блок 4)		4,00				4,00	
1	Reinforcement Learning	E	4,00				4,00	GPC-2, GPC-4, PC-1, UC-3, UC-5
2	Generative Models in Machine Learning	E	4,00				4,00	GPC-2, GPC-4, PC-1, UC-3, UC-5
3	Symbolic Computation	E	4,00				4,00	
4	3D Computer Vision	E	4,00				4,00	
5	Efficient Deep Learning Systems	E	4,00				4,00	
6	Media Data Compression and Distribution	E	4,00				4,00	
7	Decentralized Systems	E	4,00				4,00	
8	Industrial Programming in Haskell	E	4,00				4,00	
9	Information Security	E	4,00				4,00	
10	Design and Engineering of Recommender Systems	O	4,00				4,00	
11	Introduction to Data Platforms	E	4,00				4,00	
	Обязательная дисциплина по выбору (2 курс 1 семестр)		5,00		5,00			
1	C++ Programming Language	E	5,00		5,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-2, PC-3, UC-1, UC-2
2	Rust Programming Language	E	5,00		5,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-2, PC-3, UC-1, UC-2
3	Python Programming Language (advanced course)	E	5,00		5,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-2, PC-3, UC-1, UC-2
4	Mathematical Logic	E	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1, UC-2
	Обязательная дисциплина (2 курс)		3,00		3,00			
1	Modern Software Engineering Practices	C	3,00		3,00			GPC-1, GPC-2, GPC-3, GPC-4, PC-2, PC-3, PC-6, PC-7, UC-1, UC-2
	Internship		31,00	3,00	5,00	7,00	16,00	
	Professional Internship		6,00	3,00		2,00	1,00	
1	Educational Internship	C	1,00			1,00		PC-1, PC-2, PC-3, PC-4
2	Educational Internship	C	3,00	3,00				GPC-4, PC-2, PC-3, PC-4, PC-5, PC-7, UC-1, UC-2, UC-3, UC-4, UC-6, UC-8
3	Work Experience Internship	C	2,00			1,00	1,00	PC-1, PC-2, PC-3, PC-4, UC-10, UC-11
	Project Internship		10,00		5,00	5,00		
1	Курсовой проект 1	C	5,00		5,00			GPC-4, PC-2, PC-3, PC-4, PC-5, PC-7, UC-1, UC-2, UC-3, UC-4
2	-	C	5,00			5,00		GPC-2, PC-1, UC-4, UC-5, UC-6
	Research Internship		15,00				15,00	

1	Preparation of Graduation Thesis	C	9,00				9,00	GPC-1, GPC-2, PC-1, PC-4, UC-2, UC-4, UC-5, UC-6, UC-8
2	Graduation Internship	C	6,00				6,00	PC-1, PC-2, PC-3, PC-4
	General Courses		14,00	9,00	1,00		4,00	
	Core General Courses		2,00	1,00	1,00			
1	Physical Training	C	1,00		1,00			UC-7
2	Safe Living Basics	C	1,00	1,00				UC-1, UC-7, UC-8
	Optional General Courses		12,00	8,00			4,00	
1	Psychology	C	4,00				4,00	
2	Legal Literacy	C	4,00	4,00				UC-1, UC-5
3	Economics	C	4,00	4,00				GPC-1, UC-5, UC-6
	Minor		20,00		10,00	10,00		
1	Minor	E	20,00		10,00	10,00		UC-1, UC-2, UC-3, UC-5, UC-6
	English		1,00				1,00	
	Examinations		1,00				1,00	
1	Independent English Exam (offered in a foreign language)	C						GPC-4, PC-1, UC-3, UC-5, UC-8
2	Project Proposal	C	1,00				1,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, PC-7, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8
3	English Language Integrative Exam (offered in a foreign language)	C						GPC-4, UC-3, UC-5, UC-8
	Optional Courses							
1	Academic English Writing (offered in a foreign language)	O	2,00				2,00	PC-4, PC-5, UC-4
2	English (offered in a foreign language)	O	14,00	8,00	6,00			GPC-2, PC-1, PC-7, UC-3, UC-4, UC-5
	Data Culture		5,00				5,00	
1	Introduction to Deep Learning (offered in a foreign language)	E	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
2	Deep Learning 1 (offered in a foreign language)	E	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
3	Service-Oriented Architectures (offered in a foreign language)	E	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
4	Independent Data Science Test. Advanced Level	C	1,00				1,00	GPC-2, GPC-4, PC-1, UC-3, UC-5
5	Independent Digital Literacy Test	C						GPC-2, GPC-4, UC-1, UC-6
6	Independent Programming Test. Advanced Level	C						GPC-4, PC-1, PC-2, UC-3, UC-5
	Final State Certification (FSC)		3,00				3,00	
	Thesis Work		3,00				3,00	
1	Presenting of Graduation Thesis	C	3,00				3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, PC-7, UC-1, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8
	State Examinations							

Curriculum agreed:

Academic Supervisor	SOKOLOV E.A.	05.04.2021
Dean	ARZHANTSEV I.V.	05.04.2021
Head of Centre for Educational Model Design	LEPESHKIN I.A.	12.04.2021

* Subject type:

Compulsory course	C
Elective course	E
Optional course	O