



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 01.03.02 Applied Mathematics and Information Science,
38.03.01 Economics

Educational Programme "Economics and Data Science"

Implementing unit: Faculty of Economic Sciences, HSE - Moscow

APPROVED

01.06.2023

Vice Rector

ROSHCHIN S.Y.

Signed with EDS

Years of Study: 2023/2024 - 2026/2027

Length of Programme: 4 years

Mode of Study: Full Time

Degree: Bachelor's degree

Block Code	Course	Subject type	Credits	Credits by Years				Planned Educational Programme Development Results
				1	2	3	4	
	Degree Programme		240,00	60,00	60,00	60,00	60,00	
	Major		175,00	55,00	44,00	43,00	33,00	
	Core Professional Block (Major)		115,00	55,00	32,00	28,00		
	Compulsory Courses		85,00	48,00	9,00	28,00		
1	Optimization in Machine Learning	C	6,00			6,00		GPC-1.AMI, GPC-3.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
2	Macroeconomics-2	C	6,00			6,00		GPC-1.AMI, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
3	Elements of Econometrics	C	10,00			10,00		GPC-1.AMI, GPC-2.ECN, GPC-3.AMI, PC-1, PC-5, PC-6, UC-1, UC-2, UC-6
4	Machine Learning 1	C	6,00			6,00		GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-2, PC-3, UC-1, UC-2, UC-6
5	Economic Thinking	C	5,00	5,00				GPC-1.AMI, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
6	Linear Algebra and Geometry	C	10,00	10,00				GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
7	C++ Programming Language	C	4,00	4,00				GPC-1.AMI, GPC-2.AMI, PC-1, PC-2, UC-1, UC-2, UC-6
8	Python Programming Language	C	4,00	4,00				GPC-1.AMI, GPC-3.AMI, PC-1, PC-2, UC-1, UC-2, UC-6
9	Algorithms and Data Structures	C	9,00	9,00				GPC-1.AMI, GPC-2.AMI, PC-2, UC-1, UC-2, UC-6
10	Calculus	C	10,00	10,00				GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6

11	Discrete Mathematics	C	6,00	6,00				GPC-1.AMI, GPC-2.AMI, GPC-3.ECN, PC-1, PC-2, UC-1, UC-2, UC-6
12	Calculus 2	C	3,00		3,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
13	Computer Architecture and Operating Systems	C	6,00		6,00			GPC-1.AMI, GPC-2.AMI, PC-2, UC-1, UC-2, UC-6
	Microeconomics - 1		7,00	7,00				
1	Microeconomics-1	E	7,00	7,00				GPC-1.AMI, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
2	Microeconomics-1 (advanced course)	E	7,00	7,00				GPC-1.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6, UC-9
	Микроэкономика-2		6,00		6,00			
1	Microeconomics-2 (advanced course) (offered in a foreign language)	E	6,00		6,00			GPC-1.AMI, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
2	Microeconomics-2 (offered in a foreign language)	E	6,00		6,00			GPC-1.AMI, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
	Макроэкономика-1		7,00		7,00			
1	Macroeconomics-1 (advanced course)	E	7,00		7,00			GPC-1.AMI, GPC-3.ECN, PC-6, PC-7, UC-1, UC-2, UC-6
2	Macroeconomics 1	E	7,00		7,00			GPC-1.AMI, GPC-3.ECN, PC-6, PC-7, UC-1, UC-2, UC-6
	Probability and Math Statistics 1		5,00		5,00			
1	Probabilities Theory and Math Statistics 1 (Advanced course)	E	5,00		5,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
2	Probabilities Theory and Math Statistics 1	E	5,00		5,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
	Probability and Math Statistics 2		5,00		5,00			
1	Probabilities and Math Statistics 2 (Advanced course)	E	5,00		5,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
2	Probability and Statistics 2	E	5,00		5,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
	Elective Professional Block (Major)		60,00		12,00	15,00	33,00	
	Научно - исследовательские семинары		3,00				3,00	
1	Methodological Research Seminar	C	3,00				3,00	GPC-1.AMI, PC-3, PC-4, PC-6, PC-7, PC-8, UC-1, UC-11, UC-2, UC-6
	Elective Courses		12,00		12,00			
1	Differential and Difference Equations	E	6,00		6,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
2	Additional Chapters of Macroeconomics-1	E	3,00		3,00			GPC-1.ECN, GPC-3.ECN, GPC-4.ECN, PC-1, PC-4, PC-5, UC-1, UC-2, UC-6, UC-9
3	Instrumental Methods for Digital Economics	E	6,00		6,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
4	Discrete Mathematics 2	E	6,00		6,00			GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2

5	Complex Analysis	E	6,00		6,00		GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2
6	Fundamentals of Matrix Computations	E	6,00		6,00		GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2
7	Functional Analysis	E	6,00		6,00		GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2
8	Digital Transformations in HR Management	E	3,00		3,00		GPC-4.ECN, GPC-5.ECN, PC-6, UC-1, UC-2, UC-6, UC-9
9	Economic History	E	3,00		3,00		GPC-1.ECN, GPC-3.ECN, PC-4, UC-1, UC-2, UC-5, UC-6
10	Economic thought of the XX-XXI centuries	E	3,00		3,00		GPC-3.ECN, PC-4, UC-1, UC-2, UC-5, UC-6
11	Essentials of Programming and Database	E	3,00		3,00		GPC-5.AMI, GPC-6.ECN, PC-1, PC-3, UC-1, UC-2, UC-6
12	Modern Methods of Data Analysis	E	3,00		3,00		GPC-2.ECN, PC-1, PC-5, UC-1, UC-2, UC-6, UC-9
13	Financial Markets	E	3,00		3,00		GPC-1.ECN, GPC-2.ECN, GPC-3.ECN, GPC-4.ECN, PC-1, PC-6, UC-1, UC-2, UC-3, UC-6
14	Python Programming Language (advanced course)	E	6,00		6,00		GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
15	Choice and Decision Theory (offered in a foreign language)	E	6,00		6,00		GPC-3.AMI, PC-7, UC-1
16	Financial Accounting and Reporting	E	6,00		6,00		GPC-2.ECN, PC-1, PC-6, PC-7, UC-1, UC-2, UC-6
	Elective Courses		15,00		15,00		
	Elective Courses (Block 1)		6,00		6,00		
1	Efficient Data Collection and Labeling via Crowdsourcing	E	6,00		6,00		GPC-1.ECN, GPC-2.ECN, GPC-3.ECN, PC-3, PC-5, PC-6, UC-1, UC-2, UC-6
2	Data Analysis in Central Banking and Finance	E	6,00		6,00		GPC-1.AMI, GPC-2.ECN, GPC-3.AMI, PC-5, PC-6, UC-1, UC-2, UC-6
3	Combinatorial Optimization	E	6,00		6,00		GPC-2.AMI, GPC-3.AMI, GPC-5.AMI, PC-2, UC-2
4	Discrete Mathematics - 2	E	6,00		6,00		GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2
5	Java Programming	E	6,00		6,00		GPC-2.AMI, GPC-5.AMI, PC-2, UC-2
6	Topological data analysis	E	6,00		6,00		GPC-2.AMI, PC-1, UC-2
	Elective Courses (Block 2)		9,00		9,00		
1	Game Theory	E	6,00		6,00		GPC-1.AMI, GPC-3.AMI, PC-1, UC-1, UC-2, UC-6
2	Introduction to Economics of Digital Platforms	E	6,00		6,00		GPC-1.ECN, GPC-2.ECN, GPC-3.ECN, GPC-4.AMI, PC-5, PC-6, UC-1, UC-2, UC-6
3	Financial Markets	E	3,00		3,00		GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6

4	Corporate Finance (offered in a foreign language)	E	3,00			3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
5	Recent Advances in Auction Theory (offered in a foreign language)	E	3,00			3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
6	Financial Institutions and Risks	E	3,00			3,00	GPC-1.ECN, GPC-4.ECN, PC-6, UC-9
7	Financial Economics (offered in a foreign language)	E	6,00			6,00	GPC-1.ECN, GPC-4.ECN, PC-6, UC-9
Elective Courses			30,00			30,00	
Elective Courses (Block 1)			10,00			10,00	
1	Decision Making under Risk and Uncertainty	E	5,00			5,00	GPC-1.AMI, GPC-3.AMI, PC-5, PC-6, UC-1, UC-2, UC-6
2	Deep Learning	E	5,00			5,00	GPC-1.AMI, GPC-3.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
3	Statistical Learning Theory	E	5,00			5,00	GPC-1.AMI, GPC-3.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
4	Bayesian Methods for Machine Learning	E	5,00			5,00	GPC-1.AMI, GPC-3.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
Elective Courses (Block 2)			10,00			10,00	
1	Introduction to Economics of Digital Platforms	E	5,00			5,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
2	Financial Markets Analysis	E	5,00			5,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-5, PC-6, UC-1, UC-11, UC-2, UC-6, UC-9
3	Banking	E	5,00			5,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-11, UC-2, UC-6
4	Dynamic Optimization in Economics and Finance	E	5,00			5,00	GPC-1.ECN, GPC-3.ECN, PC-1, UC-1, UC-2, UC-6
5	Times Series Econometrics (offered in a foreign language)	E	5,00			5,00	GPC-1.ECN, GPC-3.ECN, PC-1, PC-3, UC-1, UC-2, UC-6
6	Data Analysis in Risk Management (offered in a foreign language)	E	5,00			5,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
Elective Courses (Block 3)			4,00			4,00	
1	Large-Scale Machine Learning	E	4,00			4,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
2	Reinforcement Learning	E	4,00			4,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.ECN, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
3	Generative Models in Machine Learning	E	4,00			4,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
4	Efficient Deep Learning Systems	E	4,00			4,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
Elective Courses (Block 4)			6,00			6,00	

1	Financial Markets	E	3,00				3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6, UC-9
2	Corporate Finance (offered in a foreign language)	E	3,00				3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
3	Recent Advances in Auction Theory (offered in a foreign language)	E	3,00				3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6
4	Decision Making in the Problems of Digital Economics under Risk and Uncertainty	E	3,00				3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-11, UC-2, UC-6, UC-9
5	Monetary Economics	E	3,00				3,00	GPC-1.ECN, GPC-3.ECN, PC-5, PC-6, UC-1, UC-2, UC-6, UC-9
	Internship		36,00	2,00	5,00	6,00	23,00	
	Professional Internship		2,00	2,00				
1	Computer workshop on economics	C	2,00	2,00				GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-7, UC-1, UC-2, UC-6
	Project Internship		16,00		5,00	6,00	5,00	
1	Project	C	5,00		5,00			GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-4, PC-7, PC-9, UC-1, UC-2, UC-3, UC-6
2	Project	C	6,00			6,00		GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-4, PC-7, PC-9, UC-1, UC-2, UC-3, UC-6
3	Project	C	5,00				5,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-4, PC-7, PC-9, UC-1, UC-2, UC-3, UC-6
	Research Internship		18,00				18,00	
1	Graduation Internship	C	6,00				6,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-4, PC-7, PC-8, PC-9, UC-1, UC-10, UC-11, UC-2, UC-4, UC-6
2	Preparation of Graduation Thesis	C	12,00				12,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, GPC-5.ECN, GPC-6.ECN, PC-4, PC-7, PC-8, PC-9, UC-1, UC-11, UC-2, UC-4, UC-6
	General Courses		15,00	3,00	8,00	4,00		
	Core General Courses		2,00	1,00	1,00			
1	Safe Living Basics	C	1,00	1,00				UC-8
2	Physical Training	C	1,00		1,00			UC-7
	Optional General Courses		13,00	2,00	7,00	4,00		
1	Philosophy	C	4,00			4,00		UC-5
2	Foundations of Russian Statehood	C	2,00	2,00				UC-4, UC-5, UC-6
3	Russian History	C	4,00		4,00			UC-5
4	Legal Literacy	C	3,00		3,00			UC-10, UC-4
	English		1,00				1,00	
	Examinations		1,00				1,00	
1	Independent English Exam (offered in a foreign language)	C						UC-4

2	Project Proposal (offered in a foreign language)	C	1,00			1,00	PC-9, UC-4
3	English Language Integrative Exam (offered in a foreign language)	C					UC-4
Optional Courses							
1	Academic English Writing (offered in a foreign language)	O	2,00			2,00	UC-4
2	English Language (offered in a foreign language)	O	8,00	8,00			UC-4
3	English Language (offered in a foreign language)	O	6,00		6,00		UC-4
Data Culture			10,00		3,00	7,00	
1	Machine Learning 2	C	6,00			6,00	GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-1, PC-2, PC-3, UC-1, UC-2, UC-6
2	Independent Data Science Test. Advanced Level	C	1,00			1,00	GPC-2.AMI, GPC-4.AMI, GPC-5.AMI, GPC-6.ECN, PC-1, PC-2, PC-3, UC-1, UC-11, UC-2, UC-6
3	Independent Digital Literacy Test	C					GPC-4.AMI, GPC-5.ECN, GPC-6.ECN, PC-1, UC-1, UC-2, UC-6
4	Independent Programming Test. Advanced Level	C					GPC-2.AMI, GPC-4.AMI, GPC-5.ECN, GPC-6.ECN, PC-1, PC-2, UC-1, UC-11, UC-2, UC-6
5	External Examinations on Digital Skills. Entry-level	C					GPC-4.AMI, GPC-5.ECN, GPC-6.ECN, PC-1, UC-1, UC-11, UC-2, UC-6
6	External Examinations on Digital Skills. Intermediate Level	C					GPC-2.AMI, GPC-3.AMI, GPC-5.ECN, GPC-6.ECN, PC-1, PC-2, UC-1, UC-11, UC-2, UC-6
7	External Examinations on Digital Skills. Final Level	C					GPC-2.AMI, GPC-4.AMI, GPC-5.AMI, GPC-6.ECN, PC-1, PC-2, PC-3, UC-1, UC-11, UC-2, UC-6
8	Algorithms and Data Structures 2	C	3,00		3,00		GPC-1.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-2, UC-1, UC-2, UC-6
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.AMI, GPC-2.AMI, GPC-3.AMI, GPC-4.AMI, PC-4, PC-6, PC-7, PC-9, UC-1, UC-11, UC-2, UC-4, UC-6
State Examinations							

Curriculum agreed:

Academic Supervisor

SAMONENKO I.Y.

26.05.2023

Dean

PEKARSKIY S.E.

26.05.2023

Head of Centre for
Educational Model Design

LEPESHKIN I.A.

31.05.2023

* Subject type:

Compulsory course

C

Elective course

E

Optional course

O