



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 01.03.04 Applied Mathematics  
Educational Programme "Applied Mathematics"

Specializations: "Applied methods of stochastic analysis", "Mathematical and computer methods for modern technologies", "Mathematical modelling, control and information processing"

Implementing unit: Tikhonov Moscow Institute of Electronics and Mathematics, HSE - Moscow

Years of Study: 2021/2022 - 2024/2025

Length of Programme: 4 years

Mode of Study: Full Time

Degree: Bachelor's degree

APPROVED  
04.05.2021  
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		240,00	60,00	60,00	60,00	60,00	
	Major		159,00	47,00	39,00	42,00	31,00	
	Core Professional Block (Major)		113,00	44,00	37,00	24,00	8,00	
	Subject Areas		113,00	44,00	37,00	24,00	8,00	
	Real, Complex and Functional Analysis		42,00	13,00	13,00	11,00	5,00	
1	Optimization Methods	C	4,00			4,00		GPC-1, GPC-2, PC-1, PC-9, UC-1, UC-2, UC-6
2	Equations of Mathematical Physics	C	4,00			4,00		GPC-1, GPC-2, PC-1, PC-9, UC-1, UC-2, UC-6
3	Control Theory	C	5,00				5,00	GPC-1, GPC-2, GPC-3, PC-1, PC-3, PC-9, UC-1, UC-2, UC-6
4	Calculus	C	18,00	13,00	5,00			GPC-1, GPC-2, PC-9, UC-1, UC-2, UC-6
5	Calculus	C						GPC-1, GPC-2, PC-9, UC-1, UC-2
6	Theory of Complex Functions	C	4,00		4,00			GPC-1, PC-9, UC-1, UC-2, UC-6
7	Functional Analysis	C	7,00		4,00	3,00		GPC-1, PC-1, PC-9, UC-1, UC-2, UC-6
	Differential Equations		4,00		4,00			
1	Differential Equations	C	4,00		4,00			GPC-1, PC-1, PC-9, UC-1, UC-2, UC-6
	Linear Algebra and Analytical Geometry		10,00	10,00				
1	Linear Algebra and Analytical Geometry	C	10,00	10,00				GPC-1, GPC-2, PC-9, UC-1, UC-2, UC-6
	Algebra and Discrete Mathematics		8,00	8,00				
1	Algebra	C	4,00	4,00				GPC-1, PC-9, UC-1, UC-2, UC-6
2	Discrete Mathematics	C	4,00	4,00				GPC-1, GPC-2, PC-9, UC-1, UC-2, UC-6
	Probability Theory and Mathematical Statistics		11,00		6,00	5,00		

1	Theory of Stochastic Processes	C	5,00			5,00		GPC-1, GPC-2, PC-1, PC-9, UC-1, UC-2, UC-6
2	Probability Theory and Mathematical Statistics	C	6,00		6,00			GPC-1, GPC-2, PC-1, PC-7, PC-9, UC-1, UC-2, UC-6
	Natural Sciences and Engineering		15,00	7,00	8,00			
1	Physics	C	11,00	7,00	4,00			GPC-1, PC-6, PC-7, PC-9, UC-1, UC-2, UC-6
2	Theoretical Mechanics	C	4,00		4,00			GPC-1, GPC-2, PC-1, PC-9, UC-1, UC-2, UC-6
	Algorithmisation		11,00			8,00	3,00	
1	Operating Systems	C	4,00			4,00		GPC-4, PC-3, PC-9, UC-1, UC-2, UC-6
2	Numerical Methods (offered in a foreign language)	C	7,00			4,00	3,00	GPC-3, GPC-4, PC-3, PC-9, UC-1, UC-2, UC-6
	Programming		12,00	6,00	6,00			
1	Algorithmization and Programming	C	12,00	6,00	6,00			GPC-3, GPC-4, PC-9, UC-1, UC-2, UC-6
	Elective Professional Block (Major)		46,00	3,00	2,00	18,00	23,00	
	Дисциплины по выбору ОП		10,00			7,00	3,00	
1	Computer Practicum 3	C	4,00			4,00		GPC-3, GPC-4, PC-1, PC-9
2	Databases	C	3,00			3,00		GPC-4, PC-3, PC-9, UC-1, UC-2, UC-6
3	Workshop "Information Systems"	C	3,00				3,00	GPC-4, PC-3, PC-9, UC-1, UC-2
	Научно-исследовательский/Проектный семинар		8,00	3,00	2,00	3,00		
1	Career-oriented Seminar "Introduction to Profession"	C	3,00	3,00				GPC-2, PC-2, UC-1, UC-3, UC-4
2	International Research and Development Projects (offered in a foreign language)	C	5,00		2,00	3,00		GPC-2, PC-10, PC-5, PC-8, UC-1, UC-3, UC-4
	Дисциплина по выбору		4,00			4,00		
1	Elective Courses	E	4,00			4,00		GPC-1, GPC-2, PC-8, PC-9, UC-1
	Блок дисциплин по выбору		24,00			4,00	20,00	
	"Математические и компьютерные методы для современных технологий"		24,00			4,00	20,00	
1	Elective Courses	E	21,00			4,00	17,00	GPC-1, GPC-2, PC-8, PC-9, UC-1
2	Research Seminar	C	3,00				3,00	GPC-2, PC-2, PC-4, PC-5, PC-7, PC-9, UC-1, UC-3, UC-4
	"Математическое моделирование, управление и обработка информации"		24,00			4,00	20,00	
1	Elective Courses	E	21,00			4,00	17,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-7, PC-9, UC-1, UC-2, UC-4, UC-6
2	Research Seminar	C	3,00				3,00	GPC-2, PC-4, PC-5, PC-7, PC-9, UC-1, UC-3, UC-4
	"Прикладные методы стохастического анализа"		24,00			4,00	20,00	
1	Elective Courses	E	21,00			4,00	17,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, UC-1, UC-2, UC-3, UC-6
2	Research Seminar	C	3,00				3,00	GPC-2, PC-2, PC-4, PC-5, PC-7, PC-9, UC-1, UC-3, UC-4

	Internship		38,00	8,00	10,00	8,00	12,00	
	Professional Internship		6,00			3,00	3,00	
1	Work Experience Internship	C	3,00			3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-10, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-3, UC-4, UC-5, UC-6
2	Graduation Internship	C	3,00				3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-10, 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-6
	Project Internship		23,00	8,00	10,00	5,00		
1	Project	C	8,00		3,00	5,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-2, PC-4, PC-5, PC-9, UC-1, UC-2, UC-3, UC-6
2	"Python in science and engineering" Computer practice	C	3,00	3,00				GPC-3, GPC-4, PC-9, UC-1, UC-2
3	Computer Practicum 1	C	3,00	3,00				GPC-3, GPC-4, PC-5, PC-9, UC-1, UC-2
4	Проект 1 курс	E	2,00	2,00				GPC-3, PC-2, PC-5, PC-7
5	Computer Practicum 2	C	3,00		3,00			GPC-4, PC-1, PC-8, UC-1, UC-2
6	Computer Practicum in Mathematics-I	C	4,00		4,00			GPC-4, PC-1, PC-8, UC-1, UC-2
	Research Internship		9,00				9,00	
1	Preparation of Graduation Thesis	C	9,00				9,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-10, 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, UC-7, UC-8
	General Courses		14,00	5,00	1,00		8,00	
	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		12,00	4,00			8,00	
1	Economics	C	4,00				4,00	UC-10, UC-11, UC-3, UC-4, UC-5, UC-9
2	Legal Literacy	C	4,00				4,00	UC-4, UC-5
3	History	C	4,00	4,00				UC-3, UC-4, UC-5
	Minor		20,00		10,00	10,00		
1	Minor	C	20,00		10,00	10,00		GPC-1, GPC-4, PC-4, PC-7, UC-1, UC-2, UC-6
	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-10, 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-2, UC-4

2	English (offered in a foreign language)	O	8,00	8,00				UC-3, UC-4, UC-5, UC-6
3	English (offered in a foreign language)	O	6,00		6,00			UC-4
	Data Culture		5,00				5,00	
1	Independent Programming Test. Advanced Level	C						UC-1
2	Data Science, AI and Generative Models Independent Test. Advanced Level	C	1,00				1,00	UC-1
3	Data Analysis and Machine Learning	C	4,00				4,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-7, PC-9, UC-1, UC-2
4	Independent Digital Literacy Test	C						UC-1
	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-10, 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, UC-7, UC-8

**Curriculum agreed:**

Academic Supervisor	Presnova A.P.	30.03.2021
Dean	KROUK E.A.	31.03.2021
Head of Centre for Educational Model Design	LEPESHKIN I.A.	30.04.2021

\* Subject type:

Compulsory course	C
Elective course	E
Optional course	O