National Research University Higher School of Economics (HSE)

Curriculum

Field of study 01.04.04 Applied Mathematics,
01.04.02 Applied Mathematics and Informatics

Educational Programme "Systems Analysis and Mathematical Technologies"

Trajectories: "Management Systems and Information Processing", "Mathematical Methods and Computer Technologies", "Supercomputer Simulations in Science and Engineering"

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

1 st, 2023/2024 academic year

APPROVED

20.06.2023

Vice Rector

ROSHCHIN S.Y.

Signed with EDS

Length of Programme: 2 years
Years of Study: 2023/2024 - 2024/2025
Mode of Study: Full Time
Degree: Master's degree / MBA

Block Code	Course	Subject type	Department	Credits	Total Academic Hours	Contact Hours	Allocation of Contact Hours				Additional Information
							1	2	3	4	
	Degree Programme			**60,00**	**2 280**	**566**	**98**	**144**	**182**	**142**	
	Mathematical Methods and Computer Technologies (Research track)			**60,00**	**2 280**	**566**	**98**	**144**	**182**	**142**	
	Major			**42,00**	**1 596**	**492**	**84**	**128**	**160**	**120**	
	Elective Courses			**6,00**	**228**	**60**	**28**	**32**			
1	Modeling in Hydrodynamics	E	Department of Applied Mathematics	6,00	228	60	28	32A			
2	Symmetries, Representations and Complex Analysis	E	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Filtering and Predicting Data	E	Department of Applied Mathematics	6,00	228	60	28	32A			
	Compulsory Courses			**36,00**	**1 368**	**432**	**56**	**96**	**160**	**120**	
1	Data Analysis and Machine Learning	C	Department of Applied Mathematics	6,00	228	72		32A	40A		Online Course
2	Analysis of nonlinear and multiphase processes	C	Department of Applied Mathematics	6,00	228	80			40	40A	
3	High-Level Modelling and Simulation of Digital Systems	C	Department of Applied Mathematics	6,00	228	60	28	32A			
4	Computer Molecular Biology and Medicine	C	Department of Applied Mathematics	6,00	228	60	28	32A			Foreign language
5	Stochastic Methods for Engineering Applications	C	Department of Applied Mathematics	6,00	228	80			40	40A	

6	Functional Integrals and Functional Derivatives in Mathematical Modelling	C	Department of Applied Mathematics	6,00	228	80			40	40A	
	Key Seminars			**10,00**	**380**	**72**	**14**	**16**	**22**	**20**	
1	Mathematical methods and computer technology (mentor seminar)	C	Department of Applied Mathematics	10,00	380	72	14A	16	22	20A	
	Magolego			**3,00**	**114**						
1	All-university Pool MAGOLEGO Courses	E		3,00	114						
	Internship			**5,00**	**190**	**2**				**2**	
	Project Internship			**5,00**	**190**	**2**				**2**	
1	Project	E		5,00	190	2				2A	
	Mathematical Methods and Computer Technologies (Applied track)			**60,00**	**2 280**	**566**	**98**	**144**	**182**	**142**	
	Major			**42,00**	**1 596**	**492**	**84**	**128**	**160**	**120**	
	Elective Courses			**6,00**	**228**	**60**	**28**	**32**			
1	Modeling in Hydrodynamics	E	Department of Applied Mathematics	6,00	228	60	28	32A			
2	Symmetries, Representations and Complex Analysis	E	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Filtering and Predicting Data	E	Department of Applied Mathematics	6,00	228	60	28	32A			
	Compulsory Courses			**36,00**	**1 368**	**432**	**56**	**96**	**160**	**120**	
1	Data Analysis and Machine Learning	C	Department of Applied Mathematics	6,00	228	72		32A	40A		Online Course
2	Analysis of nonlinear and multiphase processes	C	Department of Applied Mathematics	6,00	228	80			40	40A	
3	High-Level Modelling and Simulation of Digital Systems	C	Department of Applied Mathematics	6,00	228	60	28	32A			
4	Computer Molecular Biology and Medicine	C	Department of Applied Mathematics	6,00	228	60	28	32A			Foreign language
5	Stochastic Methods for Engineering Applications	C	Department of Applied Mathematics	6,00	228	80			40	40A	
6	Functional Integrals and Functional Derivatives in Mathematical Modelling	C	Department of Applied Mathematics	6,00	228	80			40	40A	
	Key Seminars			**10,00**	**380**	**72**	**14**	**16**	**22**	**20**	
1	Mathematical methods and computer technology (mentor seminar)	C	Department of Applied Mathematics	10,00	380	72	14A	16	22	20A	
	Magolego			**3,00**	**114**						
1	All-university Pool MAGOLEGO Courses	E		3,00	114						
	Internship			**5,00**	**190**	**2**				**2**	
	Project Internship			**5,00**	**190**	**2**				**2**	
1	Project	E		5,00	190	2				2A	
	Management Systems and Information Processing (Research track)			**60,00**	**2 280**	**516**	**98**	**144**	**158**	**116**	
	Major			**42,00**	**1 596**	**442**	**84**	**128**	**136**	**94**	
	Elective Courses			**6,00**	**228**	**60**	**28**	**32**			

1	Modeling in Hydrodynamics	E	Department of Applied Mathematics	6,00	228	60	28	32A			
2	Symmetries, Representations and Complex Analysis	E	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Filtering and Predicting Data	E	Department of Applied Mathematics	6,00	228	60	28	32A			
	Compulsory Courses			**36,00**	**1 368**	**382**	**56**	**96**	**136**	**94**	
1	Data Analysis and Machine Learning	C	Department of Applied Mathematics	6,00	228	72		32A	40A		Online Course
2	High-Level Modelling and Simulation of Digital Systems	C	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Applications of the Theory of Operators and Functional Analysis	C	Department of Applied Mathematics	6,00	228	60			32	28A	
4	Systems Analysis	C	Department of Applied Mathematics	6,00	228	60	28	32A			
5	Modern Control Theory Methods	C	Department of Applied Mathematics	6,00	228	50			24	26A	
6	Stochastic Methods for Engineering Applications	C	Department of Applied Mathematics	6,00	228	80			40	40A	
	Key Seminars			**10,00**	**380**	**72**	**14**	**16**	**22**	**20**	
1	Control and information processing systems (mentor seminar)	C	Department of Applied Mathematics	10,00	380	72	14A	16	22	20A	
	Magolego			**3,00**	**114**						
1	All-university Pool MAGOLEGO Courses	E		3,00	114						
	Internship			**5,00**	**190**	**2**				**2**	
	Project Internship			**5,00**	**190**	**2**				**2**	
1	Project	E		5,00	190	2				2A	
	Management Systems and Information Processing (Applied track)			**60,00**	**2 280**	**516**	**98**	**144**	**158**	**116**	
	Major			**42,00**	**1 596**	**442**	**84**	**128**	**136**	**94**	
	Elective Courses			**6,00**	**228**	**60**	**28**	**32**			
1	Modeling in Hydrodynamics	E	Department of Applied Mathematics	6,00	228	60	28	32A			
2	Symmetries, Representations and Complex Analysis	E	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Filtering and Predicting Data	E	Department of Applied Mathematics	6,00	228	60	28	32A			
	Compulsory Courses			**36,00**	**1 368**	**382**	**56**	**96**	**136**	**94**	
1	Data Analysis and Machine Learning	C	Department of Applied Mathematics	6,00	228	72		32A	40A		Online Course
2	High-Level Modelling and Simulation of Digital Systems	C	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Applications of the Theory of Operators and Functional Analysis	C	Department of Applied Mathematics	6,00	228	60			32	28A	
4	Systems Analysis	C	Department of Applied Mathematics	6,00	228	60	28	32A			
5	Modern Control Theory Methods	C	Department of Applied Mathematics	6,00	228	50			24	26A	

6	Stochastic Methods for Engineering Applications	C	Department of Applied Mathematics	6,00	228	80			40	40A	
	Key Seminars			**10,00**	**380**	**72**	**14**	**16**	**22**	**20**	
1	Control and information processing systems (mentor seminar)	C	Department of Applied Mathematics	10,00	380	72	14A	16	22	20A	
	Magolego			**3,00**	**114**						
1	All-university Pool MAGOLEGO Courses	E		3,00	114						
	Internship			**5,00**	**190**	**2**				**2**	
	Project Internship			**5,00**	**190**	**2**				**2**	
1	Project	E		5,00	190	2				2A	
	Supercomputer Simulations in Science and Engineering (Research track)			**60,00**	**2 280**	**546**	**106**	**144**	**158**	**138**	
	Major			**42,00**	**1 596**	**464**	**84**	**128**	**136**	**116**	
	Elective Courses			**6,00**	**228**	**60**	**28**	**32**			
1	Introduction to numerical methods of optimization	E	Joint Department of Information and Communication Facilities and Systems with RAS Dorodnitsyn Computing Centre	6,00	228	60	28	32A			
2	Modeling in Hydrodynamics	E	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Symmetries, Representations and Complex Analysis	E	Department of Applied Mathematics	6,00	228	60	28	32A			
	Compulsory Courses			**36,00**	**1 368**	**404**	**56**	**96**	**136**	**116**	
1	Data Analysis and Machine Learning	C	Department of Applied Mathematics	6,00	228	72		32A	40A		Online Course
2	High-Level Modelling and Simulation of Digital Systems	C	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Selected Chapters of Quantum Mechanics	C	Department of Applied Mathematics	6,00	228	60	28	32A			
4	Machine Learning for a Model Construction	C	Department of Applied Mathematics	3,00	114	44				44A	
5	Population Models in Genomics	C	Department of Applied Mathematics	3,00	114	28			28A		Foreign language
6	Stochastic Methods for Engineering Applications	C	Department of Applied Mathematics	6,00	228	80			40	40A	
7	Supercomputer workshop	C	Department of Applied Mathematics	6,00	228	60			28	32A	
	Key Seminars			**10,00**	**380**	**80**	**22**	**16**	**22**	**20**	
1	Supercomputer Simulation in Science and Engineering (mentor seminar)	C	Department of Applied Mathematics	10,00	380	80	22A	16	22	20A	
	Magolego			**3,00**	**114**						
1	All-university Pool MAGOLEGO Courses	E		3,00	114						
	Internship			**5,00**	**190**	**2**				**2**	
	Project Internship			**5,00**	**190**	**2**				**2**	
1	Project	E		5,00	190	2				2A	

	Supercomputer Simulations in Science and Engineering (Applied track)			**60,00**	**2 280**	**546**	**106**	**144**	**158**	**138**	
	Major			**42,00**	**1 596**	**464**	**84**	**128**	**136**	**116**	
	Elective Courses			**6,00**	**228**	**60**	**28**	**32**			
1	Introduction to numerical methods of optimization	E	Joint Department of Information and Communication Facilities and Systems with RAS Dorodnitsyn Computing Centre	6,00	228	60	28	32A			
2	Modeling in Hydrodynamics	E	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Symmetries, Representations and Complex Analysis	E	Department of Applied Mathematics	6,00	228	60	28	32A			
	Compulsory Courses			**36,00**	**1 368**	**404**	**56**	**96**	**136**	**116**	
1	Data Analysis and Machine Learning	C	Department of Applied Mathematics	6,00	228	72		32A	40A		Online Course
2	High-Level Modelling and Simulation of Digital Systems	C	Department of Applied Mathematics	6,00	228	60	28	32A			
3	Selected Chapters of Quantum Mechanics	C	Department of Applied Mathematics	6,00	228	60	28	32A			
4	Machine Learning for a Model Construction	C	Department of Applied Mathematics	3,00	114	44				44A	
5	Population Models in Genomics	C	Department of Applied Mathematics	3,00	114	28			28A		Foreign language
6	Stochastic Methods for Engineering Applications	C	Department of Applied Mathematics	6,00	228	80			40	40A	
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1	Supercomputer Simulation in Science and Engineering (mentor seminar)	C	Department of Applied Mathematics	10,00	380	80	22A	16	22	20A	
	Magolego			**3,00**	**114**						
1	All-university Pool MAGOLEGO Courses	E		3,00	114						
	Internship			**5,00**	**190**	**2**				**2**	
	Project Internship			**5,00**	**190**	**2**				**2**	
1	Project	E		5,00	190	2				2A	

Curriculum agreed:

Academic Supervisor	SLASTNIKOV S.A.	15.06.2023
Dean	KROUK E.A.	15.06.2023
Head of Centre for Educational Model Design	LEPESHKIN I.A.	20.06.2023

* Subject type:

Compulsory course	C
Elective course	E