



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 09.03.04 Software Engineering
Educational Programme "Software Engineering"

Implementing unit: Faculty of Computer Science, HSE - Moscow

APPROVED
03.05.2024
Vice Rector
ROSHCHIN S.Y.
Signed with EDS

Years of Study: 2024/2025 - 2027/2028

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		154,00	50,00	41,00	36,00	27,00	
	Core Professional Block (Major)		106,00	41,00	38,00	23,00	4,00	
	Core Disciplines 1 year		31,00	31,00				
1	Algebra	C	9,00	9,00				GPC-2, GPC-8, PC-1, UC-2, UC-3
2	Discrete Mathematics	C	9,00	9,00				GPC-1, GPC-2, GPC-3, PC-2, UC-2, UC-5, UC-7
3	Calculus	C	9,00	9,00				GPC-4, GPC-6, GPC-8, PC-3, UC-4, UC-8
4	Introduction into Software Engineering	C	4,00	4,00				GPC-2, GPC-5, GPC-7, PC-4, UC-11, UC-4
	Core Disciplines 2 year		14,00		14,00			
1	Probability Theory	C	5,00		5,00			GPC-2, PC-2, UC-2
2	Mathematical Statistics	C	5,00		5,00			GPC-2, PC-2, UC-2
3	Group Dynamics and Communication in Software Engineering Professional Practice	C	4,00		4,00			GPC-3, PC-5, UC-2, UC-6
	Core Disciplines 3 Year		4,00			4,00		
1	Software Quality Assurance and Testing	C	4,00			4,00		GPC-3, PC-8, UC-6
	Core Disciplines 4 Year		4,00				4,00	
1	Software Project Management	C	4,00				4,00	GPC-7, PC-6, UC-8
	Core Disciplines for Cohorts 1 and 2		53,00	10,00	24,00	19,00		
	Core Disciplines for C		53,00	10,00	24,00	19,00		
1	Algorithms and Algorithmic Languages	E	7,00	7,00				GPC-4, PC-5, UC-4
2	Computer Architecture and Assembly Language	E	3,00	3,00				GPC-4, PC-6, UC-4
3	Java Programming	E	8,00		8,00			GPC-3, PC-8, UC-5

4	Algorithms and Data Structures	E	4,00		4,00			GPC-8, PC-8, UC-8
5	Databases (part 1)	E	4,00		4,00			GPC-5, PC-3, UC-7
6	Foundations of Operating Systems	E	4,00		4,00			GPC-5, PC-5, UC-10
7	Formal Languages and Automata	E	4,00		4,00			GPC-3, PC-7, UC-5
8	Compiler Technologies	E	5,00			5,00		GPC-4, PC-6, UC-8
9	Functional Programming	E	5,00			5,00		GPC-5, PC-9, UC-8
10	Databases (part 2)	E	5,00			5,00		GPC-7, PC-3, UC-10
11	Machine Learning	E	4,00			4,00		GPC-6, PC-4, UC-3
	Core Disciplines fo C#		53,00	10,00	24,00	19,00		
1	C# Programming	E	7,00	7,00				GPC-4, PC-7, UC-4
2	C++ Programming Basics	E	3,00	3,00				GPC-2, PC-8, UC-4
3	Software Design	E	8,00		8,00			GPC-6, PC-6, UC-4
4	Algorithms and Data Structures 1	E	4,00		4,00			GPC-3, PC-6, UC-7
5	Algorithms and Data Structures 2	E	4,00		4,00			GPC-3, PC-7, UC-8
6	Computer System Architecture	E	4,00		4,00			GPC-7, PC-1, UC-10, UC-11
7	Operating Systems	E	4,00		4,00			GPC-3, PC-13, PC-14, UC-1
8	Databases	E	5,00			5,00		GPC-3, PC-13, UC-10
9	Development and Analysis of Requirements	E	5,00			5,00		GPC-3, PC-14, UC-7
10	Software Engineering Economics	E	4,00			4,00		GPC-5, PC-6, UC-10
11	Software Systems Architecture Design	E	5,00			5,00		GPC-2, PC-9, UC-5
	Elective Professional Block (Major)		48,00	9,00	3,00	13,00	23,00	
	Computer-based Workshop on Algebra		3,00	3,00				
1	Computer Practicum on Algebra in Python	E	3,00	3,00				GPC-2, PC-9, UC-4
2	Computer-based Workshop on Algebra in Matlab	E	3,00	3,00				GPC-2, PC-10, UC-4
	Computer-based Workshop on Mathematical Analysis		3,00	3,00				
1	Computer-based Workshop on Mathematical Analysis in Matlab	E	3,00	3,00				GPC-2, PC-11, UC-4
2	Computer Practicum on Mathematical Analysis in Python	E	3,00	3,00				GPC-2, PC-12, UC-4
	Научно-исследовательский семинар, 1 курс		3,00	3,00				
1	Research Seminar "Automata and Process Models"	E	3,00	3,00				GPC-4, PC-13, UC-2
2	Research Seminar "Geographic Information Systems"	E	3,00	3,00				GPC-2, PC-14, UC-4
3	Research Seminar "Linux software distribution"	E	3,00	3,00				GPC-4, PC-4, UC-2
4	Research Seminar "Neuroinformatics"	E	3,00	3,00				GPC-2, PC-4, UC-4
5	Research seminar "Neural Network Technologies"	E	3,00	3,00				GPC-2, PC-3, UC-2
6	Research Seminar "Development of Cyber-Physical Systems"	E	3,00	3,00				GPC-4, PC-8, UC-2
7	Research Seminar "Introduction to cloud technology"	E	3,00	3,00				GPC-4, PC-5, UC-4
8	Research Seminar "Python: Popular Libraries And Practical Problem Solving"	E	3,00	3,00				GPC-2, PC-5, UC-2
9	Research Seminar "Basics of Game Development"	E	3,00	3,00				GPC-2, PC-10, UC-4

10	Research Seminar "Introduction to System Programming"	E	3,00	3,00				GPC-4, PC-9, UC-4
11	Research Seminar "Software Development Methodologies"	E	3,00	3,00				GPC-2, PC-7, UC-4
Research Seminar 2 Year			3,00		3,00			
1	Research Seminar "Information Security Methods and Algorithms"	E	3,00		3,00			GPC-4, PC-10, UC-5
2	Research Seminar "Programmable Crypto Economics"	E	3,00		3,00			GPC-5, PC-7, UC-8
3	Research Seminar "PHP Web Application Development"	E	3,00		3,00			GPC-4, PC-7, UC-3
Research Seminar 3rd Year			3,00			3,00		
1	Research Seminar "Cloud Technology"	E	3,00			3,00		GPC-2, PC-8, UC-6
2	Research Seminar "Data and Knowledge Management"	E	3,00			3,00		GPC-3, PC-9, UC-3
3	Research Seminar "Development of Web Applications in JavaScript"	E	3,00			3,00		GPC-3, PC-11, UC-2
Научно-исследовательский семинар 4 курс			3,00				3,00	
1	Research Seminar "Computer Vision Technologies"	E	3,00				3,00	GPC-5, PC-11, UC-5
2	Research Seminar "Data Engineering"	E	3,00				3,00	GPC-3, PC-13, UC-7
3	Research Seminar "DWH. Enterprise Architecture And Data Modeling"	E	3,00				3,00	GPC-5, PC-6, UC-8
Electives 3 year			10,00			10,00		
Electives Semester 1			5,00			5,00		
1	Spatial Data Management	E	5,00			5,00		GPC-6, PC-8, UC-6
2	IOS Applications Development Basics	E	5,00			5,00		GPC-2, PC-11, UC-5
3	IoT Ecosystems	E	5,00			5,00		GPC-1, PC-11, UC-5
Electives Semester 2			5,00			5,00		
1	Distributed Databases and Data Warehouses	E	5,00			5,00		GPC-4, PC-10, UC-4
2	Distributed Computing	E	5,00			5,00		GPC-3, PC-11, UC-1
3	Computer Networks	E	5,00			5,00		GPC-4, PC-9, UC-5
Electives 4 year			20,00				20,00	
Computer Science Electives			10,00				10,00	
1	Informatization Management	E	10,00				10,00	GPC-2, PC-10, UC-3
2	Agile in Enterprise Environment	E	10,00				10,00	GPC-2, PC-8, UC-8
3	Soft Skills Development	E	10,00				10,00	GPC-4, PC-4, UC-6
Math Electives			10,00				10,00	
1	Mathematical Modeling and Simulation	E	10,00				10,00	GPC-4, PC-11, UC-5
2	Mathematical Methods for Distributed Ledger Systems	E	10,00				10,00	GPC-4, PC-8, UC-10
3	Computational Complexity Theory	E	10,00				10,00	GPC-3, PC-11, UC-6
Internship			36,00		8,00	8,00	20,00	
Professional Internship			6,00		3,00	3,00		
1	Technological Internship	C	3,00		3,00			GPC-2, PC-10, UC-6

2	Work Experience Internship	C	3,00			3,00		GPC-3, PC-12, UC-6
	Project Internship		16,00		5,00	5,00	6,00	
1	Term Project 1	C	5,00		5,00			GPC-2, PC-10, UC-6
2	Term Project 2	C	5,00			5,00		GPC-6, PC-12, UC-8
3	Team Project	C	6,00				6,00	GPC-5, PC-8, UC-10
	Research Internship		14,00				14,00	
1	Graduation Internship	C	6,00				6,00	GPC-3, PC-9, UC-6
2	Preparation of Graduation Thesis	C	8,00				8,00	GPC-2, PC-8, UC-6
	General Courses		19,00	10,00	1,00		8,00	
	Core General Courses		2,00	1,00	1,00			
1	Physical Training	C	1,00		1,00			GPC-2, PC-4, UC-2
2	Safe Living Basics	C	1,00	1,00				GPC-2, PC-2, UC-4
	Optional General Courses		17,00	9,00			8,00	
1	Russian History	C	4,00	4,00				GPC-4, PC-5, UC-1
2	Foundations of Russian Statehood	C	2,00	2,00				PC-8, UC-10, UC-9
3	Introduction to law	C	4,00				4,00	GPC-4, PC-4, UC-2
4	Philosophy	C	4,00				4,00	GPC-1, PC-4, UC-2
5	Economics	C	3,00	3,00				PC-8
	Minor		20,00		10,00	10,00		
1	Minor	E	20,00		10,00	10,00		GPC-3, GPC-5, GPC-6, PC-4, PC-5, PC-8, UC-2, UC-4, UC-6
	English		1,00				1,00	
	Examinations		1,00				1,00	
1	Independent English Exam							GPC-2, PC-4, PC-6, UC-2, UC-4
2	Project Proposal (offered in a foreign language)	C	1,00				1,00	GPC-3, GPC-4, PC-5, PC-7, UC-2, UC-4, UC-6
3	English Language Integrative Exam (offered in a foreign language)	C						GPC-4, PC-6, UC-8
	Optional Courses							
1	English Language (offered in a foreign language)	O	14,00	8,00	6,00			GPC-5, PC-8, UC-1, UC-3
2	Academic English Writing (offered in a foreign language)	O						GPC-2, GPC-4, PC-5, PC-6, UC-2, UC-3, UC-4
	Data Culture		6,00				6,00	
1	Mathematical Methods for Data Analysis	C	5,00				5,00	GPC-3, GPC-5, PC-2, UC-4
2	Independent Digital Literacy Test	C						GPC-2, PC-4, UC-6
3	Independent Programming Test. Advanced Level	C						GPC-6, PC-2, UC-4
4	Data Science, AI and Generative Models Independent Test. Advanced Level	C	1,00				1,00	GPC-3, PC-8, UC-5
5	External Examinations on Digital Skills. Entry-level	C						GPC-7, PC-14, UC-8
6	External Examinations on Digital Skills. Intermediate Level	C						GPC-3, PC-13, UC-8
7	External Examinations on Digital Skills. Final Level	C						GPC-7, PC-13, UC-8
	Final State Certification (FSC)		4,00				4,00	
	Thesis Work		4,00				4,00	

1	Presenting of Graduation Thesis	C	4,00			4,00	GPC-5, PC-11, PC-12, UC-8
---	---------------------------------	---	------	--	--	------	---------------------------

Curriculum agreed:

Academic Supervisor Pavlochev N.A. 27.04.2024

Dean ARZHANTSEV I.V. 29.04.2024

Head of Centre for
Educational Model Design LEPESHKIN I.A. 03.05.2024

* Subject type:

Compulsory course C

Elective course E

Optional course O