



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 09.03.04 Software Engineering

Educational Programme "Дизайн и разработка информационных продуктов"

Implementing unit: Faculty of Computer Science, HSE - Moscow

APPROVED
19.04.2024
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		148,00	41,00	40,00	34,00	33,00	
	Core Professional Block (Major)		127,00	41,00	37,00	28,00	21,00	
	Subject areas of mathematical disciplines		37,00	26,00	11,00			
	по математическому анализу		10,00	10,00				
1	Calculus	C	10,00	10,00				GPC-1, UC-1
	Algebra and Geometry		10,00	10,00				
1	Linear Algebra and Geometry	C	10,00	10,00				GPC-1, GPC-4, UC-3, UC-5
	Discrete Mathematics		6,00	6,00				
1	Discrete Mathematics	C	6,00	6,00				GPC-2, GPC-4, UC-3, UC-5
	in probability theory and mathematical statistics		11,00		11,00			
1	Probability Theory	C	5,00		5,00			GPC-1, GPC-2, UC-1
2	Mathematical Statistics	C	6,00		6,00			GPC-1, GPC-2, UC-1
	Subject areas Computer Science		46,00	15,00	18,00	9,00	4,00	
	Programming		25,00	11,00	14,00			
1	Java Programming Language (Advanced Course)	C	4,00		4,00			GPC-1, GPC-2, GPC-3, PC-1, PC-5, UC-1, UC-2
2	Development of backend services using Java and Spring	C	6,00		6,00			GPC-1, GPC-2, GPC-3, GPC-5, GPC-6, PC-1, PC-3, PC-4, PC-5, UC-1, UC-2, UC-3
3	Python Programming Language	C	4,00		4,00			GPC-1, GPC-2, GPC-3, PC-1, PC-5, UC-1, UC-2
4	Java programming language	C	7,00	7,00				GPC-1, GPC-2, GPC-3, PC-1, PC-5, UC-1, UC-2

5	C++ Programming Language	C	4,00	4,00				GPC-1, GPC-2, GPC-3, PC-1, PC-5, UC-1, UC-3
	по алгоритмам и структурам данных		16,00	4,00	4,00	4,00	4,00	
1	Data Engineering 1: Data warehouse	C	4,00		4,00			GPC-1, GPC-3, PC-1, PC-3, UC-1, UC-2
2	Data Engineering 2: Big Data processing methods and systems	C	4,00			4,00		GPC-1, GPC-4, PC-1, PC-3, UC-1
3	Data Engineering 3: DWH	C	4,00				4,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-3, UC-1, UC-2
4	Data Engineering 0: Database and SQL Basics	C	4,00	4,00				GPC-1, GPC-2, GPC-3, PC-1, UC-1, UC-2
	organization of calculations		5,00				5,00	
1	Software infrastructure	C	5,00				5,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-5, UC-1, UC-2
	Subject Areas Software Engineering		44,00		8,00	19,00	17,00	
	software engineering		15,00				9,00	6,00
1	Software Engineering 1: Multithreaded Programming	C	4,00				4,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-3, PC-5, UC-1, UC-2
2	Software Engineering 2: Distributed systems	C	5,00				5,00	GPC-1, PC-1, PC-3, PC-5, UC-1, UC-2, UC-3
3	Software Engineering 3: System design	C	6,00					6,00
	software systems architecture design		12,00		8,00	4,00		
1	Computer Architecture and Operating Systems	C	8,00		8,00			GPC-3, GPC-4, PC-1, PC-3, UC-1, UC-3
2	Information Security	C	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, PC-3, UC-1, UC-2
	Quality assurance and testing		8,00				3,00	5,00
1	SRE	C	5,00					5,00
2	Software testing (offered in a foreign language)	C	3,00				3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-5, UC-1, UC-2
	requirements development and analysis		3,00				3,00	
1	Product development	C	3,00				3,00	GPC-1, GPC-2, GPC-3, PC-2, PC-3, PC-5, UC-1, UC-2
	software project management		6,00					6,00
1	Project Management	C	3,00					3,00
2	Agile Methodologies (offered in a foreign language)	C	3,00					3,00
	GPC-2, GPC-7, GPC-8, UC-1, UC-11, UC-2, UC-3, UC-4, UC-5, UC-6, UC-9							
	Elective Professional Block (Major)		21,00		3,00	6,00	12,00	
	Project seminar, 3rd year		3,00				3,00	
1	Project seminar "Backend development"	E	3,00				3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2

2	Project seminar "Design of distributed systems"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
3	Project seminar "IOS development"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
4	Project seminar "Web interface development"	C	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
5	Project seminar "Android development"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
	Project seminar, 2st course		3,00		3,00		
1	Project seminar "Backend development"	E	3,00		3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
2	Project seminar "Design of distributed systems"	E	3,00		3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
3	Project seminar "IOS development"	E	3,00		3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
4	Project seminar "Web interface development"	E	3,00		3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
5	Project seminar "Android development"	E	3,00		3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
	Project seminar, 4th year		3,00			3,00	
1	Project seminar "Backend development"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
2	Project seminar "Design of distributed systems"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
3	Project seminar "IOS development"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
4	Project seminar "Web interface development"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
5	Project seminar "Android development"	E	3,00			3,00	GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-2
	Elective Courses 3rd Year (1 out of 2)		3,00			3,00	
1	System Analytics	E	3,00			3,00	GPC-3, GPC-4, GPC-5, PC-1, PC-2, PC-4, PC-5, UC-2, UC-3
2	Product Analytics	E	3,00			3,00	GPC-1, GPC-2, GPC-3, PC-1, PC-2, PC-5, UC-1, UC-2
	Elective disciplines 4th year (3 out of 5)		9,00			9,00	
1	System Analytics	E	3,00			3,00	GPC-3, GPC-4, GPC-5, PC-1, PC-2, PC-4, PC-5, UC-2, UC-3
2	Product Analytics	E	3,00			3,00	GPC-1, GPC-2, GPC-3, PC-1, PC-2, PC-5, UC-1, UC-2
3	DevOps	E	3,00			3,00	GPC-1, GPC-2, GPC-3, PC-1, PC-5, UC-1, UC-2
4	Frontend development	E	3,00			3,00	GPC-1, PC-1, PC-2, PC-4, PC-5, UC-1, UC-2, UC-3

5	Mobile Development	E	3,00				3,00	GPC-1, PC-1, PC-2, PC-4, PC-5, UC-1, UC-2, UC-3
	Internship		36,00	5,00	6,00	9,00	16,00	
	Professional Internship		8,00	5,00		3,00		
1	Technological Internship	C	5,00	5,00				PC-1, PC-2, PC-3, PC-4, PC-5
2	Work Experience Internship	C	3,00			3,00		PC-1, PC-2, PC-3, PC-4, PC-5
	Project Internship		19,00		6,00	6,00	7,00	
1	Graduation Internship	C	7,00				7,00	PC-1, PC-2, PC-3, PC-4, PC-5
2	Course project 1	C	6,00		6,00			GPC-3, GPC-6, GPC-7, GPC-8, PC-5, UC-1, UC-2, UC-3
3	Course project 2	C	6,00			6,00		GPC-3, GPC-6, GPC-7, GPC-8, PC-1, PC-5, UC-1, UC-2, UC-3
	Research Internship		9,00				9,00	
1	Preparation of Graduation Thesis	C	9,00				9,00	GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-11, UC-2, UC-3, UC-5, UC-6, UC-9
	General Courses		14,00	7,00			7,00	
	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-10, UC-11, UC-2, UC-6, UC-8
	Optional General Courses		12,00	6,00			6,00	
1	Foundations of Russian Statehood	C	2,00	2,00				UC-1, UC-10, UC-11, UC-4, UC-5
2	Russian History	C	4,00	4,00				UC-1, UC-10, UC-11, UC-4, UC-5
3	Economics	C	3,00				3,00	UC-1, UC-10, UC-5, UC-6, UC-9
4	Law	C	3,00				3,00	UC-1, UC-4, UC-5
	Minor		20,00		10,00	10,00		
1	Minor	C	20,00		10,00	10,00		UC-1, UC-10, UC-11, UC-2, UC-3, UC-4, UC-5, UC-6, UC-8, UC-9
	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-1, PC-2, PC-3, PC-4, PC-5, UC-4
3	English Language Integrative Exam (offered in a foreign language)	C						UC-4
	Optional Courses							
1	English for mathematics and IT (offered in a foreign language)	O	6,00		6,00			UC-4, UC-5
2	International English Examinations Practice (offered in a foreign language)	O	3,00		3,00			UC-4, UC-5
3	English for communicative purposes (offered in a foreign language)	O	8,00	8,00				UC-4, UC-5
	Data Culture		18,00	7,00	4,00	7,00		

1	Machine Learning 1	C	6,00			6,00	GPC-1, GPC-2, GPC-3, GPC-4, GPC-6, PC-1, PC-2, PC-3, UC-1, UC-2
2	Data Science, AI and Generative Models Independent Test. Advanced Level	C	1,00			1,00	GPC-2, GPC-4, UC-3, UC-5
3	Independent Programming Test. Advanced Level	C					GPC-2, GPC-4
4	Algorithms and Data Structures 2	C	4,00		4,00		GPC-2, GPC-5, GPC-8
5	Algorithms and Data Structures 1	C	7,00	7,00			GPC-2, GPC-5, GPC-8
6	Independent Digital Literacy Test	C					GPC-2, GPC-4, UC-1, UC-4, UC-6
7	External Examinations on Digital Skills. Entry-level	C					GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, UC-1, UC-2
8	External Examinations on Digital Skills. Intermediate Level	C					GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, UC-1, UC-2
9	External Examinations on Digital Skills. Final Level	C					GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, UC-1, UC-2
	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, GPC-5, GPC-6, GPC-7, GPC-8, PC-1, PC-2, PC-3, PC-4, PC-5, UC-1, UC-10, UC-11, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
	State Examinations						

Curriculum agreed:

Academic Supervisor Sin D.D. 17.04.2024

Dean ARZHANTSEV I.V. 17.04.2024

Head of Centre for Educational Model Design LEPESHKIN I.A. 19.04.2024

* Subject type:

Compulsory course C
Elective course E
Optional course O