



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 09.03.04 Software Engineering,  
38.03.05 Business Informatics

Educational Programme "Разработка информационных систем для бизнеса"

Specializations: "Information Systems Lifecycle Management", "IT Analytics", "Software Systems Development"

Implementing unit: -, HSE - Perm

APPROVED

06.06.2022

Vice Rector

ROSHCHIN S.Y.

Signed with EDS

Years of Study: 2022/2023 - 2025/2026

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		158,00	47,00	40,00	35,00	36,00	
	Core Professional Block (Major)		102,00	40,00	37,00	12,00	13,00	
	Subject Areas		102,00	40,00	37,00	12,00	13,00	
1	Data Analysis in Python	C	3,00		3,00			GPC-2.SEN, GPC-8.SEN, PC-17, PC-18
2	Probability Theory and Mathematical Statistics	C	5,00		5,00			GPC-1.SEN, UC-1
3	Applied algorithms and data structures	C	3,00		3,00			GPC-4.BUI, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-7
4	Algebra	C	7,00	7,00				GPC-1.SEN, UC-1
5	Calculus	C	10,00	10,00				GPC-1.SEN, UC-1
6	Databases	C	5,00		5,00			GPC-4.BUI, GPC-8.SEN, PC-9
7	Practice in Basics of Technical Documentation Designing	C	3,00	3,00				GPC-4.SEN, GPC-5.BUI, PC-3, PC-4, UC-4
8	Программирование	C	10,00	10,00				GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-2, PC-8, PC-9
9	Leadership and Team Management	C	3,00			3,00		GPC-5.BUI, PC-12, PC-19, PC-2, PC-7, UC-11, UC-3, UC-4
10	IT Project Management	C	5,00				5,00	GPC-2.BUI, GPC-3.BUI, GPC-5.BUI, GPC-7.SEN, PC-1, PC-10, PC-2, PC-7, UC-2
11	Algorithms and Data Structures	C	8,00		8,00			GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-2, PC-8, PC-9

12	Development and Analysis of Requirements	C	5,00			5,00		GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-10, UC-11, UC-3
13	Software Systems Design and Architecture	C	5,00				5,00	GPC-1.BUI, GPC-3.BUI, GPC-7.SEN, PC-10
14	Software Design	C	8,00		8,00			GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-2, PC-6, PC-8, PC-9
15	Enterprise Architecture	C	4,00			4,00		GPC-1.BUI, GPC-4.BUI, GPC-7.SEN, PC-14, PC-15, PC-4, PC-6
16	Discrete Mathematics	C	10,00	10,00				GPC-1.SEN, UC-1
17	Computer Architecture and Operating Systems	C	5,00		5,00			GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-2, PC-8, PC-9
18	Economics of Software Product Development	C	3,00				3,00	GPC-3.BUI, GPC-4.SEN, GPC-7.SEN, PC-2, PC-7, UC-2, UC-9
	Elective Professional Block (Major)		56,00	7,00	3,00	23,00	23,00	
	Seminars and Career Guidance Disciplines		16,00	7,00	3,00	3,00	3,00	
	Compulsory Seminars		13,00	7,00	3,00		3,00	
1	Career Guidance Seminar	C	3,00	3,00				GPC-1.SEN, GPC-3.BUI, GPC-4.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-3, PC-5, UC-1
2	Project Seminar	C	7,00	4,00	3,00			GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-5, UC-2, UC-3
3	Research Seminar	C	3,00				3,00	GPC-1.SEN, GPC-3.SEN, GPC-7.SEN, UC-1, UC-2, UC-4, UC-6
	Optional Research Seminar		3,00				3,00	
1	Research Seminar "Formal Methods in Software Engineering"	E	3,00				3,00	GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-5, UC-1, UC-2, UC-4, UC-6
2	Research Seminar "Analytics in IoT"	E	3,00				3,00	GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-5, UC-1, UC-2, UC-4, UC-6
3	Research Seminar "Development of mobile applications"	E	3,00				3,00	GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-5, UC-1, UC-2, UC-4, UC-6
4	Research Seminar "Data Analysis"	E	3,00				3,00	GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-5, UC-1, UC-2, UC-4, UC-6
	Specialization Courses		40,00				20,00	20,00
	Courses of Educational Track "Analytics in IT"		40,00				20,00	20,00
	Compulsory Courses		20,00				10,00	10,00
1	Business Process Modelling	C	4,00				4,00	GPC-1.BUI, GPC-4.BUI, GPC-7.SEN, PC-15, PC-4, PC-6
2	Modern Conception of Management	C	3,00				3,00	GPC-1.SEN, GPC-2.BUI, PC-1, UC-6
3	Financial and Managerial Accounting	C	3,00				3,00	GPC-1.BUI, GPC-4.SEN, PC-13, UC-9

4	Entrepreneurship	C	3,00			3,00	PC-13, PC-15
5	Quantitative Decision Making in a Big Data Society	C	4,00			4,00	GPC-1.BUI, GPC-2.BUI, GPC-4.BUI, PC-1, PC-13
6	Management and innovation of e-business	C	3,00			3,00	GPC-2.BUI, PC-13, PC-16
	UX/UI, Frontend		5,00			5,00	
1	User Interface Design	E	5,00			5,00	GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-10, PC-4, PC-8, PC-9
2	Development in Business-Oriented Programming Languages	E	5,00			5,00	GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-10, PC-4, PC-8, PC-9
3	Digital Product Management	E	5,00			5,00	GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-10, PC-4, PC-8, PC-9
4	Product Analytics	E	5,00			5,00	GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-10, PC-4, PC-8, PC-9
	Components of a digital enterprise Development		5,00			5,00	
1	Mobile Development	E	5,00			5,00	GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-16, PC-18, PC-2
2	Web Application Development	E	5,00			5,00	GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-16, PC-18, PC-2
	Информационные системы в бизнесе		7,00			7,00	
1	Enterprise Automation	E	7,00			7,00	GPC-4.BUI, PC-14, PC-16, PC-4
2	Intelligent Systems	E	7,00			7,00	GPC-1.BUI, GPC-4.BUI, PC-16
	Digital Enterprise		3,00			3,00	
1	Electronic Business	E	3,00			3,00	GPC-1.BUI, GPC-4.BUI, GPC-7.SEN, PC-1, PC-11, PC-14, PC-15, PC-16, PC-17
2	Digital business models, platform solutions and e-commerce	E	3,00			3,00	GPC-1.BUI, GPC-4.BUI, GPC-7.SEN, PC-1, PC-11, PC-14, PC-15, PC-16, PC-17
3	Internet Entrepreneurship	E	3,00			3,00	GPC-1.BUI, GPC-4.BUI, GPC-7.SEN, PC-1, PC-11, PC-14, PC-15, PC-16, PC-17
	Courses of Educational Track "Software Systems Development"		40,00			20,00	20,00
	Compulsory Courses		5,00			5,00	
1	Software Quality Assurance and Testing (offered in a foreign language)	C	5,00			5,00	GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-7
	Modern Programming Technologies		5,00			5,00	
1	Functional and Logic Programming	E	5,00			5,00	GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-9
2	Java Programming	E	5,00			5,00	GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-9

3	Web Programming	E	5,00			5,00		GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-9
4	Computer Graphics	E	5,00			5,00		GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-9
	<b>Data Analytics</b>		<b>5,00</b>			<b>5,00</b>		
1	Data Warehouses and BI	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-17, PC-9
2	Integration, Processing and Visualization of Data	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-17, PC-9
3	Machine Learning	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-17, PC-9
4	Time Series Analysis	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-17, PC-9
	<b>Systems and Process Analysis</b>		<b>5,00</b>			<b>5,00</b>		
1	Cyber-Physical Systems	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-7.SEN, PC-4, PC-6
2	Object-Oriented Analysis and Design	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-7.SEN, PC-4, PC-6
3	Simulation Modeling	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-7.SEN, PC-4, PC-6
4	Optimization Methods	E	5,00			5,00		GPC-1.SEN, GPC-4.BUI, GPC-7.SEN, PC-4, PC-6
	<b>Programming Methods and Techniques</b>		<b>14,00</b>			<b>14,00</b>		
1	Large Information Systems Implementation Projects	E	7,00			7,00		GPC-2.SEN, GPC-4.SEN, PC-12, PC-16, PC-4, PC-7
2	Distributed Computing	E	7,00			7,00		GPC-2.SEN, GPC-3.BUI, GPC-6.SEN, GPC-7.SEN, PC-18, PC-7, PC-9
3	Contemporary Software Systems Development with Python	E	7,00			7,00		GPC-2.SEN, GPC-3.BUI, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-2, PC-8, PC-9
	<b>Intelligent and Information Systems Methods</b>		<b>6,00</b>			<b>6,00</b>		
1	Neuron Networks	E	3,00			3,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-10, PC-17, PC-18, PC-9
2	Semantic Information Systems	E	3,00			3,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-10, PC-17, PC-18, PC-9
3	Data Analysis Technologies in Internet	E	3,00			3,00		GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-10, PC-17, PC-18, PC-9
	<b>Courses of Educational Track "Information Systems Lifecycle Management"</b>		<b>40,00</b>			<b>20,00</b>	<b>20,00</b>	
	<b>Compulsory Courses</b>		<b>25,00</b>			<b>15,00</b>	<b>10,00</b>	
1	Software Quality Assurance and Testing (offered in a foreign language)	C	5,00			5,00		GPC-2.BUI, GPC-3.BUI, GPC-7.SEN, PC-11
2	Business Process Modelling	C	4,00			4,00		GPC-1.BUI, GPC-4.BUI, GPC-7.SEN, PC-15, PC-4, PC-6

3	Financial and Managerial Accounting	C	3,00			3,00		GPC-1.BUI, GPC-4.SEN, PC-13, UC-9
4	Modern Conception of Management	C	3,00			3,00		GPC-1.SEN, GPC-2.BUI, PC-1, UC-6
5	Entrepreneurship	C	3,00				3,00	PC-13, PC-15
6	Quantitative Decision Making in a Big Data Society	C	4,00				4,00	GPC-1.BUI, GPC-2.BUI, PC-1, PC-13
7	Management and innovation of e-business	C	3,00				3,00	PC-13, PC-16
	Modern Programming Technologies		5,00			5,00		
1	Functional and Logic Programming	E	5,00			5,00		GPC-2.SEN, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN
2	Java Programming	E	5,00			5,00		GPC-2.SEN, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN
3	Web Programming	E	5,00			5,00		GPC-2.SEN, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN
4	Computer Graphics	E	5,00			5,00		GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-10, PC-18, PC-9
	Корпоративные информационные системы		7,00				7,00	
1	Large Information Systems Implementation Projects	E	7,00				7,00	GPC-2.SEN, GPC-4.SEN, PC-12, PC-16, PC-4, PC-7
2	Enterprise Automation	E	7,00				7,00	GPC-2.SEN, GPC-4.SEN, PC-12, PC-16, PC-4, PC-7
	Intelligent and Information Systems Methods		3,00				3,00	
1	Neuron Networks	E	3,00				3,00	GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-10, PC-17, PC-18, PC-9
2	Data Analysis Technologies in Internet	E	3,00				3,00	GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-10, PC-17, PC-18, PC-9
	Internship		36,00	3,00	5,00	10,00	18,00	
	Professional Internship		5,00			5,00		
1	Work Experience Internship	C	5,00			5,00		GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-2, PC-5, UC-1, UC-2, UC-4, UC-6
	Project Internship		19,00	3,00	5,00	5,00	6,00	
1	Graduation Internship	E						GPC-1.SEN, GPC-2.BUI, GPC-3.SEN, GPC-4.BUI, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, GPC-8.SEN, PC-10, PC-11, PC-12, PC-13, PC-14, PC-15, PC-16, PC-17, PC-18, PC-19, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-4, UC-6, UC-9
2	Preparation of Graduation Thesis	E						PC-5, UC-4
3	Research or Applied Project	E	3,00	3,00				GPC-1.BUI, GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, UC-3, UC-6
4	Term Paper	C	10,00		5,00	5,00		GPC-1.BUI, GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, UC-3, UC-6

5	Capstone Design Project	E	6,00				6,00	GPC-1.BUI, GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, UC-3, UC-6
	Research Internship		12,00				12,00	
1	Graduation Internship	E	6,00				6,00	GPC-1.SEN, GPC-3.SEN, GPC-5.SEN, GPC-6.BUI, GPC-7.SEN, PC-10, PC-13, PC-14, PC-16, PC-2, PC-5, UC-1, UC-4
2	Preparation of Graduation Thesis	E	6,00				6,00	GPC-1.SEN, GPC-2.SEN, GPC-3.SEN, GPC-4.SEN, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, GPC-8.SEN, PC-10, PC-11, PC-12, PC-13, PC-14, PC-16, PC-17, PC-18, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-2, UC-4, UC-6, UC-9
	General Courses		14,00	10,00			4,00	
	Core General Courses		2,00	2,00				
1	Physical Training	C	1,00	1,00				UC-7
2	Safe Living Basics	C	1,00	1,00				UC-8
	Optional General Courses		12,00	8,00			4,00	
1	Legal Literacy	C	4,00	4,00				UC-10, UC-2
2	Elective General Course	E	4,00				4,00	UC-4, UC-5
3	Economics	C	4,00	4,00				GPC-1.BUI, PC-13, UC-9
	Minor		20,00		10,00	10,00		
1	Minor	E	20,00		10,00	10,00		UC-1, UC-2, UC-5, UC-6
	English		1,00				1,00	
	Examinations		1,00				1,00	
1	Independent English Exam	C						UC-4
2	Project Proposal	C	1,00				1,00	PC-5, UC-4
3	English Language Integrative Exam	C						UC-4
	Optional Courses							
1	Academic English Writing	O	2,00				2,00	PC-5, UC-4
2	English (offered in a foreign language)	O	14,00	8,00	6,00			UC-4
	Data Culture		10,00		5,00	5,00		
1	Independent Programming Test. Advanced Level	C						GPC-1.SEN, GPC-2.SEN, GPC-3.BUI, GPC-5.SEN, GPC-6.SEN, GPC-7.SEN, PC-18
2	External Examinations on Digital Skills. Entry-level	C						GPC-2.SEN
3	External Examinations on Digital Skills. Intermediate Level	C						GPC-2.SEN
4	External Examinations on Digital Skills. Final Level	C						GPC-2.SEN
5	Independent Data Science Test. Advanced Level	C	1,00				1,00	GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-18, PC-9
6	Independent Digital Literacy Test	C						GPC-4.SEN, PC-3, PC-4
7	Machine Learning	C	4,00				4,00	GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-17
8	Mathematical Methods for Data Analysis	C	5,00		5,00			GPC-1.SEN, GPC-4.BUI, GPC-8.SEN, PC-17, PC-9

	Final State Certification (FSC)		1,00				1,00	
	Thesis Work		1,00				1,00	
1	Presenting of Graduation Thesis	C	1,00				1,00	PC-5, UC-4
	State Examinations							

**Curriculum agreed:**

Academic Supervisor	LANIN V.V.	01.06.2022
Dean	ISOPESKUL O.Y.	01.06.2022
Deputy Director	ZAGORODNOVA E.P.	01.06.2022
Head of Centre for Educational Model Design	LEPESHKIN I.A.	02.06.2022

\* Subject type:

Compulsory course	C
Elective course	E
Optional course	O