



National Research University Higher School of Economics (HSE)

Basic Curriculum

Field of study 11.03.02 Infocommunication Technologies and Systems  
Educational Programme "Infocommunication Technologies and Systems"

Specializations: "Electronics of Infocommunication Technologies and Communication Systems", "Info Telecommunication Technologies",  
"Infocommunication Technologies and Cyber-physical Systems", "Quantum Infocommunication Technologies"

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

Years of Study: 2022/2023 - 2025/2026

Length of Programme: 4 years

Mode of Study: Full Time

Degree: Bachelor's degree

APPROVED  
13.04.2022  
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		163,00	51,00	39,00	37,00	36,00	
	Core Professional Block (Major)		78,00	49,00	29,00			
1	Calculus	C	16,00	12,00	4,00			GPC-1, UC-1
2	Discrete Mathematics	C	4,00	4,00				GPC-1, UC-1
3	Physics	C	16,00	12,00	4,00			GPC-1, GPC-2, UC-1
4	Computer Science	C	4,00	4,00				GPC-1, GPC-5, PC-1
5	Algorithmization and Programming	C						GPC-1, GPC-2, UC-1, UC-2
6	Algebra and Geometry	C	5,00	5,00				GPC-1, UC-1
7	Algorithmization and Programming	C	12,00	12,00				GPC-1, GPC-2, GPC-5, UC-1, UC-2
8	Metrology and Electric and Radio Measurements	C	4,00		4,00			GPC-1, GPC-2, PC-2, PC-7, UC-1
9	Probability Theory and Mathematical Statistics	C	4,00		4,00			GPC-1, GPC-3, UC-1
10	The General Theory of Communication	C	4,00		4,00			GPC-1, GPC-4, PC-1, UC-1
11	Electronics	C	5,00		5,00			GPC-1, GPC-2, GPC-4, PC-1, UC-1
12	Electric Circuit Theory	C	4,00		4,00			GPC-1, GPC-2, GPC-4, PC-1
	Elective Professional Block (Major)		85,00	2,00	10,00	37,00	36,00	
	Дисциплины по выбору ОП		35,00		5,00	22,00	8,00	
1	Circuit Engineering of Telecommunication Devices	C	4,00			4,00		GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1
2	Digital Signal Processing	C	4,00			4,00		GPC-1, GPC-3, PC-1, UC-1
3	Electronic Devices and Communication Means Physics	C	4,00			4,00		GPC-1, GPC-3, PC-1, UC-1
4	Electromagnetic Fields and Waves in Contemporary Telecommunications	C	4,00			4,00		GPC-1, PC-1, UC-1

5	Foundations of Computational Methods (offered in a foreign language)	C	3,00			3,00		GPC-1, PC-1, PC-4, PC-5, UC-1
6	Machine Learning	C	3,00			3,00		GPC-1, PC-1, UC-1
7	Digital systems for information transmitting and receiving	C	4,00				4,00	GPC-1, PC-1, UC-1
8	Wireless Communication Systems	C	4,00				4,00	GPC-1, PC-1, UC-1
9	Fundamentals of Building Information and Communication Systems and Networks	C	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1
	Научно-исследовательские и проектные семинары		16,00	2,00	5,00	5,00	4,00	
1	Project Workshop "Tools in Project Activities"	C	5,00			5,00		GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, UC-1, UC-2, UC-3
2	Project Seminar 1	C	2,00	2,00				GPC-1, PC-1, UC-1, UC-3
3	Project Seminar	C	4,00				4,00	GPC-3, PC-1, PC-4, PC-6, UC-1, UC-2, UC-4
4	Project Workshop "Engineering Project Activities"	C	5,00		5,00			GPC-3, PC-4, PC-6, UC-1, UC-2, UC-4
	Elective Courses		34,00			10,00	24,00	
	Infocommunication Technologies and Cyber-physical Systems		34,00			10,00	24,00	
1	IoT hardware design fundamentals	C	9,00			5,00	4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
2	Information and Coding Theories	C	5,00			5,00		GPC-1, GPC-3, PC-4, UC-1, UC-2
3	Antenna systems and devices	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
4	Optoelectronic Telecommunication Systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
5	Electromagnetic compatibility infocommunication and related systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
6	Foundations of the theory of automatic control in technical systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
7	Information security and protection of infocommunication systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-3, PC-4, UC-1, UC-2
	Electronics of Infocommunication Technologies and Communication Systems		34,00			10,00	24,00	
1	Information Technologies of Telecommunications Devices and Systems Development	C	3,00			3,00		GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, PC-8, UC-1, UC-2
2	Communication Technologies and Systems Modeling Basics	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, PC-8, UC-1, UC-2
3	Basics of Television and Radiocommunications	C	3,00				3,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
4	Communication Devices Components	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
5	Digital Devices and Microprocessors	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
6	Integrated circuits for telecommunication devices	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2

7	Design of electronic components and devices for telecommunication equipment	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
8	Power Supply Devices and Telecommunications	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
9	Devices of functional electronic	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
	<b>Quantum Infocommunication Technologies</b>		<b>34,00</b>			<b>10,00</b>	<b>24,00</b>	
1	Mathematical methods of physics	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
2	Physical foundations of quantum phenomena and devices	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
3	Manetism and spintronics, magnonics, photonics	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
4	Distributed Computing	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
5	Devices for quantum computing and communication	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
6	Introduction to quantum algoritms	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
7	Quantum solid systems	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
8	Introduction to quantum processes and devices (offered in a foreign language)	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
	<b>Info Telecommunication Technologies</b>		<b>34,00</b>			<b>10,00</b>	<b>24,00</b>	
1	Information and Coding Theories	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
2	Principles of standardization of telecommunication systems	C	5,00			5,00		GPC-2, GPC-3, GPC-4, PC-2, PC-3, PC-5, PC-7, PC-8, UC-1, UC-2
3	Fundamentals of the Internet of Things	C	4,00				4,00	GPC-2, GPC-3, PC-1, PC-4, UC-1, UC-2
4	Fundamentals of SDR System Design	C	4,00				4,00	GPC-1, GPC-4, PC-1, PC-4, UC-1, UC-2
5	Fundamentals of Mobile Network Design	C	4,00				4,00	GPC-1, GPC-4, PC-1, PC-4, UC-1, UC-2
6	Fundamentals of Wi-Fi Network Design	C	4,00				4,00	GPC-1, GPC-4, PC-4, PC-5, UC-1, UC-2
7	Basics of Designing Satellite and Radio Relay Communication Systems	C	4,00				4,00	GPC-1, GPC-2, GPC-3, PC-1, PC-5, PC-8, UC-1, UC-2
8	Information security and protection of infocommunication systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-3, PC-4, PC-5, UC-1, UC-2
	<b>Internship</b>		<b>35,00</b>	<b>4,00</b>	<b>10,00</b>	<b>8,00</b>	<b>13,00</b>	
	<b>Professional Internship</b>		<b>14,00</b>	<b>4,00</b>	<b>7,00</b>	<b>3,00</b>		
1	-	C	2,00		2,00			GPC-1, GPC-2, UC-1, UC-2
2	Work Experience Internship	C	3,00			3,00		GPC-1, GPC-2, GPC-3, GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4
3	Educational Internship	C	5,00		5,00			GPC-1, GPC-2, GPC-3, PC-1, PC-2, PC-5, UC-1, UC-2, UC-3, UC-4, UC-6
4	Computer-based Workshop on Engineering Graphics	C	4,00	4,00				GPC-1, GPC-2, PC-1, PC-2, UC-1, UC-2
	<b>Project Internship</b>		<b>15,00</b>		<b>3,00</b>	<b>5,00</b>	<b>7,00</b>	
1	Preparation of Graduation Thesis	C	7,00				7,00	GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-8, UC-1, UC-2, UC-3, UC-4, UC-6

2	Research or Applied Project	C	8,00		3,00	5,00		GPC-4, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4
	Research Internship		6,00				6,00	
1	Graduation Internship	C	6,00				6,00	GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4, UC-6
	General Courses		14,00	5,00	1,00	4,00	4,00	
	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		4,00	4,00	
1	Legal Literacy	C	4,00			4,00		UC-10, UC-11, UC-6
2	Elective general cycle disciplines	E	4,00	4,00				UC-1, UC-10, UC-11, UC-5, UC-9
3	Economics	C	4,00				4,00	UC-11, UC-6, UC-9
	Minor		20,00		10,00	10,00		
1	Minor	E	20,00		10,00	10,00		GPC-1, UC-1, UC-2
	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	UC-4
3	English Language Integrative Exam (offered in a foreign language)	C						UC-1, UC-4
	Optional Courses							
1	Academic English Writing (offered in a foreign language)	O	2,00				2,00	UC-4
2	English (offered in a foreign language)	O	8,00	8,00				UC-4
3	English (offered in a foreign language)	O	6,00		6,00			UC-4
	Data Culture		4,00			1,00	3,00	
1	External Examinations on Digital Skills. Entry-level	C						GPC-4
2	External Examinations on Digital Skills. Intermediate Level	C						GPC-4
3	External Examinations on Digital Skills. Final Level	C						GPC-4
4	Basics in computer vision (offered in a foreign language)	C	3,00				3,00	GPC-5, PC-1, UC-1
5	Independent Programming Test. Intermediate	C						UC-1
6	Data Science, AI and Generative Models Independent Test. Intermediate	C	1,00			1,00		UC-1
7	Independent Digital Literacy Test	C						GPC-1, GPC-2, PC-1, 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, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-10, UC-11, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
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**Curriculum agreed:**

Academic Supervisor ELIZAROV A.A. 07.04.2022

Dean KROUK E.A. 08.04.2022

Head of Centre for Educational Model Design LEPESHKIN I.A. 12.04.2022

\* Subject type:

Compulsory course C

Elective course E

Optional course O