



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: 2024/2025 - 2027/2028

Length of Programme: 4 years

Mode of Study: Full Time

Degree: Bachelor's degree

APPROVED
17.04.2024
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		166,00	51,00	42,00	34,00	39,00	
	Core Professional Block (Major)		78,00	49,00	29,00			
1	Metrology and Electric and Radio Measurements	C	4,00		4,00			GPC-1, GPC-2, PC-2, PC-7, UC-1
2	Theory of Probability and Mathematical Statistics	C	4,00		4,00			GPC-1, GPC-3, UC-1
3	The General Theory of Communication	C	4,00		4,00			GPC-1, GPC-4, PC-1, UC-1
4	Electronics	C	5,00		5,00			GPC-1, GPC-2, GPC-4, PC-1, UC-1
5	Electric Circuit Theory	C	4,00		4,00			GPC-1, GPC-2, GPC-4, PC-1
6	Physics	C	16,00	12,00	4,00			GPC-1, GPC-2, UC-1
7	Algorithmization and Programming	C	12,00	12,00				GPC-1, GPC-2, GPC-5, UC-1, UC-2
8	Computer Science	C	4,00	4,00				GPC-1, GPC-5, PC-1, UC-1
9	Algebra and Geometry	C	5,00	5,00				GPC-1, UC-1
10	Calculus	C	16,00	12,00	4,00			GPC-1, UC-1
11	Discrete Mathematics	C	4,00	4,00				GPC-1, UC-1
	Elective Professional Block (Major)		88,00	2,00	13,00	34,00	39,00	
	Дисциплины по выбору ОП		35,00		5,00	19,00	11,00	
1	Circuit Engineering of Telecommunication Devices	C	4,00			4,00		GPC-1, GPC-2, 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	C	4,00			4,00		GPC-1, PC-1, UC-1
5	Machine Learning	C	3,00			3,00		GPC-1, PC-1, UC-1
6	Digital systems for information transmitting and receiving	C	4,00				4,00	GPC-1, PC-1, UC-1

7	Wireless Communication Systems	C	4,00				4,00	GPC-1, PC-1, UC-1
8	Fundamentals of Building Information and Communication Systems and Networks	C	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1
9	Basics in computer vision	C	3,00				3,00	GPC-5, PC-1, UC-1
	Научно-исследовательские и проектные семинары		19,00	2,00	8,00	5,00	4,00	
1	Project Seminar "Introduction to Specialty"	C	2,00	2,00				GPC-3, PC-4, PC-6, UC-1, UC-2, UC-4
2	Project Workshop "Engineering Project Activities"	C	5,00		5,00			GPC-3, GPC-4, PC-4, PC-6, UC-1, UC-2, UC-4
3	Project Seminar	C	5,00			5,00		GPC-3, GPC-4, PC-4, PC-6, PC-8, UC-1, UC-2, UC-4
4	Project Seminar	C	4,00				4,00	PC-1, PC-3, PC-4, PC-6, PC-8, UC-1, UC-2, UC-4
5	Scientific Research Seminar "Artificial Intelligence in Engineering Education"	C	3,00		3,00			GPC-3, GPC-4, GPC-5, PC-1, PC-2, PC-4, UC-1, UC-2, UC-3, UC-6
	Elective Courses		34,00			10,00	24,00	
	Infocommunication Technologies and Cyber-physical Systems		34,00			10,00	24,00	
1	Information and Coding Theories	C	5,00			5,00		GPC-1, GPC-3, PC-4, UC-1, UC-2
2	Antenna systems and devices	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
3	IoT hardware design fundamentals	C	9,00			5,00	4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-6, 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	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
6	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
7	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
	Electronics of Infocommunication Technologies and Communication Systems		34,00			10,00	24,00	
1	Communication Technologies and Systems Modeling Basics	C	4,00			4,00		GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
2	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
3	Basics of Television and Radiocommunications	C	3,00			3,00		GPC-1, GPC-2, UC-1, UC-2
4	Communication Devices Components	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5
5	Digital Devices and Microprocessors	C	4,00				4,00	GPC-1, GPC-3, PC-4, PC-5, UC-1, UC-2
6	Integrated circuits for telecommunication devices	C	4,00				4,00	GPC-1, GPC-3, PC-4, PC-5, UC-1, UC-2
7	Power Supply Devices and Telecommunications	C	4,00				4,00	GPC-1, GPC-3, PC-4, PC-5, UC-1, UC-2
8	Design of electronic components and devices for telecommunication equipment	C	4,00				4,00	GPC-1, GPC-2, PC-4, PC-5, UC-1, UC-2
9	Devices of functional electronic	C	4,00				4,00	GPC-1, GPC-3, PC-4, PC-5, UC-1, UC-2
	Quantum Infocommunication Technologies		34,00			10,00	24,00	

1	Physical foundations of quantum phenomena and devices	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
2	Quantum solid systems	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
3	Magnetism and spintronics, magnonics, photonics	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
4	Photonic integrated circuits for quantum computing, communications and metrology	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 algorithms	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
7	Mathematical methods of physics	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
Info Telecommunication Technologies			34,00			10,00	24,00	
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
Internship			32,00	2,00	7,00	9,00	14,00	
Professional Internship			10,00	2,00	4,00	4,00		
1	Work Experience Internship	C	4,00			4,00		GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, UC-2, UC-3, UC-4
2	Educational Internship	C	4,00		4,00			GPC-1, GPC-2, GPC-3, PC-1, PC-2, UC-1, UC-2, UC-3, UC-4, UC-6
3	Algorithmization and Programming	C						GPC-1, GPC-3, GPC-5, UC-1, UC-2
4	Computer-based Workshop on Engineering Graphics	C	2,00	2,00				GPC-1, GPC-2, GPC-4, UC-1, UC-2
Project Internship			15,00		3,00	5,00	7,00	
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-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
2	Research or Applied Project	C	8,00		3,00	5,00		GPC-1, GPC-2, GPC-3, GPC-4, GPC-5, PC-4, PC-5, PC-6, PC-7, PC-8, UC-1, UC-2, UC-3, UC-4
Research Internship			7,00				7,00	

1	Graduation Internship	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-7, PC-8, UC-1, UC-2, UC-3, UC-4, UC-6
	General Courses		14,00	7,00	1,00	3,00	3,00	
	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-8
	Optional General Courses		12,00	6,00		3,00	3,00	
1	Foundations of Russian Statehood	C	2,00	2,00				UC-10, UC-11, UC-9
2	Russian History	C	4,00	4,00				UC-5, UC-6
3	Legal Literacy	C	3,00			3,00		UC-10, UC-11, UC-6
4	Economics	C	3,00				3,00	UC-11, UC-6, UC-9
	Minor		20,00		10,00	10,00		
1	Minor	C	20,00		10,00	10,00		UC-1, UC-2, UC-6
	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-1, UC-4, UC-6
3	English Language Integrative Exam (offered in a foreign language)	C						UC-4
	Optional Courses							
1	English (offered in a foreign language)	O	8,00	8,00				UC-4
2	English (offered in a foreign language)	O	6,00		6,00			UC-4
3	Academic Writing (offered in a foreign language)	O	2,00				2,00	UC-4
	Data Culture		4,00			4,00		
1	Independent Programming Test. Intermediate	C						GPC-4, GPC-5, PC-1, UC-1, UC-2
2	Data Science, AI and Generative Models Independent Test. Intermediate	C	1,00			1,00		GPC-2, GPC-5, PC-1, UC-1
3	Foundations of Computational Methods	C	3,00			3,00		GPC-1, PC-4, PC-5, UC-1, UC-2
4	Independent Digital Literacy Test	C						PC-1, UC-1
5	External Examinations on Digital Skills. Entry-level	C						GPC-5, PC-1
6	External Examinations on Digital Skills. Intermediate Level	C						GPC-5, PC-1
7	External Examinations on Digital Skills. Final Level	C						GPC-5, PC-1
	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

Curriculum agreed:

Academic Supervisor	ELIZAROV A.A.	19.02.2024
Dean	KROUK E.A.	20.02.2024
Head of Centre for Educational Model Design	LEPESHKIN I.A.	17.04.2024

* Subject type:

Compulsory course	C
Optional course	O