



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: 2021/2022 - 2024/2025

Length of Programme: 4 years

Mode of Study: Full Time

Degree: Bachelor's degree

APPROVED
27.04.2021
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		165,00	51,00	39,00	33,00	42,00	
	Core Professional Block (Major)		78,00	49,00	29,00			
	Subject Areas		78,00	49,00	29,00			
	Higher Mathematics		25,00	21,00	4,00			
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	Algebra and Geometry	C	5,00	5,00				GPC-1, UC-1
	Probability Theory and Mathematical Statistics		4,00		4,00			
1	Probability Theory and Mathematical Statistics	C	4,00		4,00			GPC-1, GPC-3, UC-1
	Computer Science		4,00	4,00				
1	Computer Science	C	4,00	4,00				GPC-1, PC-1, UC-1
	Programming		12,00	12,00				
1	Algorithmization and Programming	C						GPC-1, GPC-2, GPC-5, UC-1, UC-2
2	Algorithmization and Programming	C	12,00	12,00				GPC-1, GPC-2, GPC-5, UC-1, UC-2
	Physics		16,00	12,00	4,00			
1	Physics	C	16,00	12,00	4,00			GPC-1, GPC-2, UC-1
	Electrical Engineering		13,00		13,00			
1	Metrology and Electric and Radio Measurements	C	4,00		4,00			GPC-1, GPC-2, PC-2, UC-1
2	Electric Circuit Theory	C	4,00		4,00			GPC-1, GPC-2, PC-1, UC-1
3	Electronics	C	5,00		5,00			GPC-1, GPC-2, PC-1, UC-1
	Communication Theory		4,00		4,00			
1	The General Theory of Communication	C	4,00		4,00			GPC-1, PC-1, UC-1
	Elective Professional Block (Major)		87,00	2,00	10,00	33,00	42,00	

	Блоки дисциплины по выбору		34,00			10,00	24,00	
	Infocommunication Technologies and Cyber-physical Systems		34,00			10,00	24,00	
1	Antenna systems and devices	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
2	Optoelectronic infocommunication systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-4, PC-5, UC-1, UC-2
3	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
4	Information security and protection of infocommunication systems	C	4,00				4,00	GPC-1, GPC-3, GPC-4, PC-1, PC-3, 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 and Coding Theories	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
7	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
	Электроника инфокоммуникационных технологий и систем связи		34,00			10,00	24,00	
1	Communication Devices Components	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
2	Digital Devices and Microprocessors	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
3	Integrated circuits for telecommunication devices	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
4	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
5	Power Supply Devices and Telecommunications	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
6	Devices of functional electronic	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
7	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
8	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
9	Basics of Television and Radiocommunications	C	3,00			3,00		GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1, UC-2
	Квантовые технологии инфокоммуникаций		34,00			10,00	24,00	
1	Quantum solid systems	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
2	Manetism and spintronics, magnonics, photonics	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
3	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
4	Devices for quantum computing and communication	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
5	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

6	Introduction to quantum algorithms	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
7	Physical foundations of quantum phenomena and devices	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
8	Mathematical methods of physics	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
Info Telecommunication Technologies			34,00			10,00	24,00	
1	Fundamentals of SDR System Design	C	4,00				4,00	GPC-1, GPC-4, PC-1, PC-4, UC-1, UC-2
2	Fundamentals of the Internet of Things	C	4,00				4,00	GPC-2, GPC-3, PC-1, PC-4, UC-1, UC-2
3	Wi-Fi Network Design	C	4,00				4,00	GPC-1, GPC-4, UC-1, UC-2
4	Information security and protection of infocommunication systems	C	4,00				4,00	GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
5	Mobile Network Design	C	4,00				4,00	GPC-1, GPC-4, PC-1, PC-4, UC-1, UC-2
6	Basics of Designing Satellite and Radio Relay Communication Systems	C	4,00				4,00	GPC-1, GPC-4, PC-5, PC-7, PC-8, UC-1
7	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, UC-1, UC-2
8	Information and Coding Theories	C	5,00			5,00		GPC-1, GPC-3, PC-1, PC-4, UC-1, UC-2
Дисциплины по выбору ОП			37,00		5,00	18,00	14,00	
1	Digital systems for information transmitting and receiving	C	4,00				4,00	GPC-1, PC-1, UC-1
2	Machine Learning	C	3,00				3,00	GPC-1, PC-1, UC-1
3	Wireless Communication Systems	C	4,00				4,00	GPC-1, PC-1, UC-1
4	Basics in computer vision (offered in a foreign language)	C	3,00				3,00	GPC-5, PC-1
5	Fundamentals of Building Information and Communication Systems and Networks	C	5,00		5,00			GPC-1, GPC-3, PC-1, UC-1
6	Circuit Engineering of Telecommunication Devices	C	4,00			4,00		GPC-1, GPC-3, PC-1, PC-4, PC-5, UC-1
7	Electronic Devices and Communication Means Physics	C	5,00			5,00		GPC-1, GPC-3, PC-1, UC-1
8	Digital Signal Processing	C	4,00			4,00		GPC-1, GPC-3, PC-1, UC-1
9	Electromagnetic Fields and Waves in Contemporary Telecommunications	C	5,00			5,00		GPC-1, PC-1, UC-1
Научно-исследовательские и проектные семинары			16,00	2,00	5,00	5,00	4,00	
1	Project Seminar 1	C	2,00	2,00				GPC-1, PC-1, UC-1
2	Project Seminar	C	14,00		5,00	5,00	4,00	GPC-3, PC-1, PC-4, PC-6, UC-1, UC-2, UC-4
Internship			32,00	4,00	10,00	9,00	9,00	
Professional Internship			15,00	4,00	7,00	4,00		
1	Work Experience Internship	C	4,00				4,00	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, UC-6
2	Educational Internship	C	4,00		4,00			GPC-1, GPC-2, GPC-3, PC-1, PC-2, PC-4, PC-5, UC-1, UC-2, UC-3, UC-4, UC-6
3	Computer-based Workshop on Engineering Graphics	C	4,00	4,00				GPC-1, GPC-2, PC-1, PC-2, UC-1, UC-2

4	Computer Workshop "Introduction to Data Analysis and Visualization in Microsoft Excel"	C	3,00		3,00			GPC-1, GPC-2, UC-1, UC-2
	Project Internship		13,00		3,00	5,00	5,00	
1	Preparation of Graduation Thesis	C	5,00				5,00	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-6
2	Исследовательский или прикладной проект	C	8,00		3,00	5,00		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-5
	Research Internship		4,00				4,00	
1	Graduation Internship	C	4,00				4,00	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, 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-1, UC-10, UC-11, UC-2, UC-3, UC-5
2	Economics	C	4,00				4,00	UC-1, UC-10, UC-2, UC-4, UC-5, UC-9
3	History	C	4,00	4,00				UC-1, UC-3, UC-5
	Minor		20,00		10,00	10,00		
1	Minor	C	20,00		10,00	10,00		GPC-1, UC-1, UC-2
	English		1,00				1,00	
	Examinations		1,00				1,00	
1	Project Proposal (offered in a foreign language)	C	1,00				1,00	UC-4
2	English Language Integrative Exam (offered in a foreign language)	C						UC-4
3	Independent English Exam (offered in a foreign language)	C						UC-4
	Optional Courses							
1	English (offered in a foreign language)	O	8,00	8,00				UC-1, UC-4
2	English (offered in a foreign language)	O	6,00		6,00			UC-4
3	Academic Writing (English) (offered in a foreign language)	O	2,00				2,00	UC-4
	Data Culture		5,00			4,00	1,00	
1	Independent Programming Test. Intermediate	C						UC-1
2	Data Science, AI and Generative Models Independent Test. Intermediate	C	1,00				1,00	UC-1
3	Independent Digital Literacy Test	C						GPC-1, GPC-2, PC-1, PC-2, UC-1, UC-2
4	Foundations of Computational Methods (offered in a foreign language)	C	4,00			4,00		GPC-1, GPC-5, PC-1, PC-4, PC-5, UC-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
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Curriculum agreed:

Academic Supervisor ELIZAROV A.A. 14.04.2021

Dean KROUK E.A. 15.04.2021

Head of Centre for Educational Model Design LEPESHKIN I.A. 27.04.2021

* Subject type:

Compulsory course C

Optional course O