



Basic Curriculum

Speciality 10.05.01 Cyber Security

Educational Programme "Cyber Security"

Specializations: "Mathematical Methods of Information Security"

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

APPROVED
19.04.2022
Vice Rector
ROSHCHIN S.Y.
Signed with EDS

Years of Study: 2022/2023 - 2027/2028

Length of Programme: 5 years 6 months

Mode of Study: Full Time

Degree: Specialist's degree

Block Code	Course	Subject type	Credits	Credits by Years						Planned Educational Programme Development Results
				1	2	3	4	5	6	
	Degree Programme		330,00	60,00	60,00	60,00	60,00	60,00	30,00	
	Major		242,00	52,00	45,00	42,00	48,00	55,00		
	Core Professional Block (Major)		152,00	49,00	36,00	27,00	7,00	33,00		
1	Programming Techniques (offered in a foreign language)	C	4,00			4,00				GPC-2, GPC-7, PC-3, PC-8, UC-4, UC-5
2	Operating Systems	C	10,00			6,00	4,00			GPC-7, GPC-9, PC-2, PC-9, UC-3, UC-4
3	Information Theory	C	4,00			4,00				GPC-1, GPC-3, PC-1, PC-9, UC-1, UC-6
4	Circuit Engineering	C	3,00			3,00				GPC-4, GPC-9, PC-3, PC-4, UC-1, UC-3
5	Machine Learning	C	5,00			5,00				GPC-15
6	Mathematical Statistics	C	5,00			5,00				GPC-10, GPC-3, PC-1, PC-9, UC-1, UC-3
7	Computer Networks	C	3,00				3,00			GPC-14, GPC-6, PC-1, PC-9, UC-1, UC-3
8	Basics of Building Protected Computer Networks	C	3,00					3,00		GPC-11, GPC-15, PC-1, PC-9, UC-3, UC-6
9	Technical Protection of Information	C	6,00					6,00		GPC-16, GPC-9, PC-3, PC-7, UC-1, UC-3
10	Operating Systems Security	C	3,00					3,00		GPC-12, GPC-9, PC-2, PC-3, UC-1, UC-6
11	Software and Data Security	C	5,00					5,00		GPC-11, GPC-13, PC-3, PC-9, UC-3, UC-6
12	Cryptographic Protocols	C	5,00					5,00		GPC-19, GPC-20, PC-8, PC-9, UC-1, UC-6
13	Servers and Workstations Security	C	3,00					3,00		GPC-10, GPC-18, PC-8, PC-9, UC-3, UC-6
14	Programming of Information Security Algorithms	C	8,00					8,00		GPC-1, GPC-3, PC-1, PC-3, UC-1, UC-3
15	Calculus	C	18,00	9,00	9,00					GPC-3, GPC-8, PC-8, PC-9, UC-1, UC-6
16	Linear Algebra	C	6,00	6,00						GPC-3, GPC-8, PC-8, PC-9, UC-1, UC-6
17	Geometry	C	3,00	3,00						GPC-3, GPC-8, PC-8, PC-9, UC-1, UC-6
18	Computer Science	C	6,00	6,00						GPC-1, GPC-4, PC-1, PC-3, UC-3, UC-4
19	Programming Languages	C	15,00	12,00	3,00					GPC-1, GPC-7, PC-3, PC-8, UC-3, UC-4

20	Hardware Computer Technology	C	3,00	3,00						GPC-1, GPC-7, PC-3, PC-8, UC-1, UC-3
21	Physics	C	9,00	6,00	3,00					GPC-1, GPC-4, PC-1, PC-3, UC-1, UC-3
22	Discrete Mathematics	C	4,00	4,00						GPC-3, GPC-8, PC-1, PC-9, UC-1, UC-6
23	Algebra	C	6,00		6,00					GPC-3
24	History of Cryptography	C	3,00		3,00					GPC-10, GPC-5
25	Mathematical Logic and Theory of Algorithms	C	3,00		3,00					GPC-3
26	Organizational and Legal Support for Information Security	C	3,00		3,00					GPC-11, GPC-9
27	Probability Theory	C	3,00		3,00					GPC-3
28	Electronics	C	3,00		3,00					GPC-4
Elective Professional Block (Major)			90,00	3,00	9,00	15,00	41,00	22,00		
Дисциплины по выбору ОП			53,00	3,00	9,00	15,00	26,00			
1	English for Specific Purposes. IT and Cyber Security (offered in a foreign language)	C	3,00			3,00				UC-4
2	Differential Equations	C	3,00			3,00				GPC-3, GPC-8, PC-1, PC-9, UC-1, UC-3
3	Methods of Data Analysis	C	3,00			3,00				GPC-10, GPC-3, PC-1, PC-9, UC-1, UC-3
4	Python Programming Language	C	3,00			3,00				GPC-2, GPC-7, PC-3, PC-8, UC-3, UC-4
5	Development of Client-server Applications and Neural Network Models in Python	C	3,00			3,00				PC-4, PC-6
6	English for Professional Communication (offered in a foreign language)	C	3,00				3,00			UC-4
7	Cryptographic Methods of Information Security	C	8,00				8,00			GPC-10, GPC-18, PC-8, PC-9, UC-1, UC-3
8	Asymmetric encryption schemes	C	6,00				6,00			GPC-2, GPC-4, PC-3, PC-5, UC-1, UC-3
9	Systems and Networks of Information Transfer	C	3,00				3,00			GPC-4, GPC-8, PC-1, PC-9, UC-1, UC-3
10	Computer Security Models	C	3,00				3,00			GPC-11, GPC-13, PC-1, PC-3, UC-10, UC-6
11	Microcontroller Systems	C	3,00				3,00			GPC-2, GPC-4, PC-3, PC-5, UC-1, UC-3
12	Introduction to Number Theory	C	3,00	3,00						GPC-3, GPC-8, PC-8, PC-9, UC-1, UC-6
13	Computer Mathematics: Supplementary Chapters (offered in a foreign language)	C	3,00		3,00					GPC-3
14	Basics of Information Security	C	3,00		3,00					GPC-5, GPC-6
15	Assembly Language	C	3,00		3,00					GPC-7
Блоки дисциплин по выбору			37,00				15,00	22,00		
Elective Courses 1			37,00				15,00	22,00		
1	Database Management Systems (offered in a foreign language)	E	3,00				3,00			GPC-12, GPC-14, PC-3, PC-8, UC-1, UC-3
2	Information Security Management	E	3,00				3,00			GPC-11, GPC-13, PC-7, UC-2, UC-3
3	Methods of Information Security in Financial and Banking Activities	E	3,00				3,00			GPC-11, GPC-14, PC-4, PC-9, UC-2, UC-3
4	Information security audit	E	3,00				3,00			GPC-11, GPC-14, PC-4, PC-9, UC-2, UC-3
5	Project Seminar	E	6,00				3,00	3,00		GPC-5, GPC-8, PC-4, PC-6, UC-2, UC-9
6	Parallel Computing	E	6,00					6,00		GPC-2, GPC-7, PC-3, PC-8, UC-3, UC-4
7	Intrusion Detection Systems	E	3,00					3,00		GPC-2, GPC-7, PC-3, PC-8, UC-3, UC-4
8	Implementation Analysis of Information Security Algorithms	E	5,00					5,00		GPC-5, GPC-6, PC-5, PC-6, UC-5, UC-7
9	IT Infrastructure	E	5,00					5,00		GPC-4, GPC-5, PC-6, PC-7, UC-3, UC-4

	Elective Courses 2		37,00				15,00	22,00	
1	Number Theory Methods in Cryptography	E	3,00				3,00		GPC-10, GPC-18, PC-8, PC-9, UC-1, UC-9
2	Theory of Coding, Compression and Data Recovery	E	3,00				3,00		GPC-2, GPC-4, PC-3, PC-5, UC-1, UC-3
3	How to Process and Store Big Data and Machine Learning	E	3,00				3,00		GPC-11, GPC-13, PC-1, PC-9, UC-2, UC-3
4	Methods of Algebraic Geometry in Cryptography	E	3,00				3,00		GPC-10, GPC-16, PC-8, PC-9, UC-3, UC-6
5	Project Seminar	E	6,00				3,00	3,00	GPC-5, GPC-8, PC-4, PC-6, UC-2, UC-9
6	Methods of Synthesis and Analysis of Modern Cryptographic Algorithms	E	6,00					6,00	GPC-10, GPC-16, PC-8, PC-9, UC-3, UC-6
7	Quantum Computations	E	3,00					3,00	GPC-10, GPC-16, PC-8, PC-9, UC-3, UC-6
8	Legal Regime of Personal Data	E	5,00					5,00	GPC-5, GPC-6, PC-6, PC-7, UC-5, UC-6
9	Introduction to quantum algorithms	E	5,00					5,00	GPC-10, GPC-11, PC-6, PC-7, UC-6, UC-7
	Internship		43,00		4,00	4,00	7,00	5,00	23,00
	Research Internship		23,00						23,00
1	Mathematical Statistics	C							GPC-10, GPC-3, PC-1, PC-9, UC-1, UC-3
2	Preparation of Graduation Thesis	C	15,00					15,00	GPC-1, GPC-10, GPC-11, GPC-12, GPC-13, GPC-14, GPC-15, GPC-16, GPC-17, GPC-18, GPC-19, GPC-2, GPC-20, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, GPC-9, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-10, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
3	Graduation Internship	C	8,00					8,00	GPC-1, GPC-10, GPC-11, GPC-12, GPC-13, GPC-14, GPC-15, GPC-16, GPC-17, GPC-18, GPC-19, GPC-2, GPC-20, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, GPC-9, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-10, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
4	Organizational and Legal Support for Information Security	C							GPC-5, GPC-9
5	Basics of Information Security	C							GPC-5, GPC-6
	Project Internship		16,00		4,00	4,00	3,00	5,00	
1	Research or Applied Project	C	16,00		4,00	4,00	3,00	5,00	GPC-1, GPC-10, GPC-11, GPC-12, GPC-13, GPC-14, GPC-15, GPC-16, GPC-17, GPC-18, GPC-19, GPC-2, GPC-20, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, GPC-9, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-10, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
	Professional Internship		4,00				4,00		
1	Work Experience Internship	C	4,00				4,00		PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9

	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-3, UC-8
2	Physical Training	C	1,00		1,00				UC-7
	Optional General Courses		12,00	4,00		4,00	4,00		
1	Economics	C	4,00			4,00			UC-10
2	Elective courses	E	4,00	4,00					GPC-5, UC-10, UC-3, UC-6, UC-9
3	Law	C	4,00				4,00		UC-10
	Minor		20,00		10,00	10,00			
1	Minor	E	20,00		10,00	10,00			GPC-1, GPC-2, PC-1, PC-2, 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	C	1,00					1,00	UC-4
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 English Writing (offered in a foreign language)	O	2,00					2,00	UC-4
	Data Culture		4,00	3,00			1,00		
1	External Examinations on Digital Skills. Entry-level	C							GPC-2
2	External Examinations on Digital Skills. Intermediate Level	C							GPC-2
3	Independent Programming Test. Intermediate	C							GPC-1, PC-1, UC-1
4	External Examinations on Digital Skills. Final Level	C							GPC-2
5	Data-Culture	C	3,00	3,00					GPC-1
6	Independent Digital Literacy Test	C							GPC-1, PC-1, UC-1
7	Data Science, AI and Generative Models Independent Test. Intermediate	C	1,00				1,00		GPC-1, PC-1, UC-1
	Final State Certification (FSC)		6,00					6,00	
	Thesis Work		4,00					4,00	
1	Presenting of Graduation Thesis	C	4,00					4,00	GPC-1, GPC-10, GPC-11, GPC-12, GPC-13, GPC-14, GPC-15, GPC-16, GPC-17, GPC-18, GPC-19, GPC-2, GPC-20, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, GPC-9, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-10, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
	Государственный экзамен		2,00					2,00	

1	Государственный междисциплинарный экзамен	C	2,00							2,00	GPC-1, GPC-10, GPC-11, GPC-12, GPC-13, GPC-14, GPC-15, GPC-16, GPC-17, GPC-18, GPC-19, GPC-2, GPC-20, GPC-3, GPC-4, GPC-5, GPC-6, GPC-7, GPC-8, GPC-9, PC-1, PC-2, PC-3, PC-4, PC-5, PC-6, PC-7, PC-8, PC-9, UC-1, UC-10, UC-2, UC-3, UC-4, UC-5, UC-6, UC-7, UC-8, UC-9
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Curriculum agreed:

Academic Supervisor	LOS A.B.	04.04.2022
Dean	KROUK E.A.	04.04.2022
Head of Centre for Educational Model Design	LEPESHKIN I.A.	12.04.2022

* Subject type:

Compulsory course	C
Elective course	E
Optional course	O