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CATALOG OF UNIVERSITY COMPONENT DISCIPLINES

EDUCATIONAL PROGRAMME **6B06328 – Information Security Systems**

Level of education: Bachelor **Duration of study: 3 years** **Year of admission: 2026**

Cycle	Component	Name of discipline	Academic credits		Semester	Learning outcomes	Short description of discipline	Prerequisites	Post-requisites
			в академи-ческих часах	в академи-ческих кредитах					
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Economic and management competencies module									
GED	EC	Environmentally sustainable technologies	150	5	1	LO11, LO12	Forming Students' Understanding of the Principles and Mechanisms for Ensuring Equal Access of Various Social Groups to Digital Technologies and Information Resources Is Achieved Through Studying the Issues of Overcoming the Digital Divide, the Accessibility of Services for People with Disabilities, as Well as the Social, Ethical and Legal Aspects of the Digital Transformation of Society.	Basic school knowledge of ecology	Industrial practice 1
GED	EC	Green economy and sustainable entrepreneurship	150	5	1	LO11	The Discipline "Green Economy and Sustainable Entrepreneurship" Is Devoted to the Study of Environmentally Oriented	Basic school knowledge of economics, ecology,	Business communications

							Economic Models and Business Strategies Aimed at Sustainable Development. The Course Examines the Concepts of the Green Economy, ESG (Environmental, Social, Governance) Approaches, Circular Economy, Sustainable Business Models and Their Impact on Global Markets.	and social studies	
GED	EC	Fundamentals of financial literacy	150	5	1	LO12	The Discipline Is Aimed at Developing the Ability to Make Informed Financial Decisions, Plan Income and Expenses, Assess Risks and Effectively Manage Their Resources in a Market Economy. He Studies Basic Knowledge in the Field of Finance and Rational Money Management, Examines the Concepts of the Financial System, Budget, Banking Products, Lending, Savings, Investments, Insurance, Taxation and Protection Against Financial Fraud.	Basic school knowledge of mathematics and economics	Business communications
GED	EC	Digital inclusion	150	5	1	LO1	The Course Is Aimed at Developing Students' Understanding of the Principles and Mechanisms for Ensuring Equal Access of Various Social Groups to Digital Technologies and Information Resources. Within the Framework of the Course, Issues Related to Overcoming the Digital Divide, Ensuring the Accessibility of Digital Services for People with Disabilities, Developing Digital Skills, as Well as the Social, Ethical, and Legal Aspects of the Digital Transformation of Society Are Examined. Special Attention Is Paid to Inclusive Design of Digital Systems and the Use of Digital Technologies in Education, Industry, and the Social Sphere.	Basic school knowledge of computer science	Industrial practice 1
GED	EC	Basics of law and anti-corruption culture	150	5	1	LO12	The Discipline Outlines the Fundamental Concepts of Law, the Constitutional Structure of the State Power of the Republic of Kazakhstan, the Rights and Freedoms of Citizens Enshrined in the Constitution, the	Basic school knowledge of social studies and history	Organization and management of the information security service

							Mechanism and Protection of Legitimate Human Interests in Case of Their Violation. The Discipline Forms Students' Improvement of Public and Individual Legal Awareness and Legal Culture, as Well as a System of Knowledge and Citizenship on Combating Corruption as an Antisocial Phenomenon.		
GED	EC	Basics of research	150	5	1	LO12	The Discipline Introduces the Basics of Scientific Activity, Covering Its Goals, Methods and Forms, Contributing to the Formation of Theoretical Knowledge and Practical Skills Necessary for the Successful Conduct of Scientific Research in a Chosen Professional Field, as Well as Developing the Ability to Independently Search, Analyze and Apply Scientific Information, Which Becomes an Important Basis for Further Research and Professional Activities.	Basic school knowledge of computer science and mathematics	Industrial practice 1
Professional module									
BD	EC	Digital forensics	150	5	3	LO4, LO6	The basic concepts of collecting, analyzing and storing electronic evidence, as well as legal and ethical aspects of work in the field of digital forensics, are considered. The technologies used to recover deleted information, analyze network attacks and identify cybercrimes are being studied. Skills are being developed to work with specialized programs and tools for digital analysis, which makes it possible to effectively conduct investigations and provide expertise in courts.	Introduction to information security	Intrusion prevention and detection systems, Security in cloud computing
BD	EC	Digital privacy	150	5	3	LO3, LO6	All aspects related to the definition and maintenance of confidentiality, integrity, accessibility, authenticity and reliability of information are considered. Important aspects are privacy technologies, data leakage risks, and information protection strategies that allow users to interact safely online. Practical skills are being developed to work with existing products and create specialized information security software	Introduction to information security	Identification and access management (IAM), Intrusion prevention and detection systems

BD	EC	Object-oriented programming	150	5	3	LO5	The discipline studies software development methods based on the object-oriented approach and the C++ programming language. The course covers the main OOP principles: encapsulation, inheritance, polymorphism, and abstraction. During the training, students develop skills in creating modular programs, working with algorithms and data structures, as well as testing and debugging applications.	Fundamentals of algorithmization and programming	Programming in Java, Software and mobile application security
BD	EC	Network programming	150	5	3	LO3, LO5, LO8	Skills for developing network applications and understanding interaction protocols in the network are developed. The fundamentals of working with sockets, data transmission technologies, and methods for ensuring the security of network connections are discussed. Client-server architectures and approaches to implementing distributed systems are studied.	Fundamentals of algorithmization and programming	Security in cloud computing, Network security
BD	EC	Fundamentals of computer networks and telecommunications (Cisco)	120	4	4	LO4	Key aspects of network technologies are considered, including OSI and TCP/IP models, types of networks (LAN, WAN), network devices and routing and switching protocols. An understanding of the principles of network infrastructure operation, configuration and diagnostics of network devices using Cisco equipment is being formed. Practical skills are acquired in setting up, administering and diagnosing networks using Cisco equipment and technologies.	Operating systems and OS security	Network security
BD	EC	Fundamentals of computer networks and telecommunications (Huawei)	120	4	4	LO4	The key concepts of network architecture, OSI and TCP/IP models, addressing and routing, channel and network layer protocols are considered. Protocols and technologies of the channel and network layers (DHCP, DNS, NAT), methods of configuring and managing Huawei network equipment, routers and switches are being studied. Practical skills of setting up and administering Huawei devices are being formed.	Operating systems and OS security	Network security
BD	EC	Hardware and software-	180	6	3	LO9,	The discipline studies the principles of using	Introduction to	Intrusion prevention

		hardware information security tools				LO10	software and hardware complexes for information protection. Course sections: software and hardware protection of information, access control to information system components, data protection from standard threats, organization of data protection during network interaction. The course is aimed at developing students" skills in using software and hardware methods and tools to ensure the information security of an object.	information security	and detection systems, Security control systems
BD	EC	Computer crime and malware	180	6	3	LO6	When studying the discipline, the problems of computer crime and malicious software are considered. They study the classification, structure, principles of operation, and distribution channels. The classification of malware is described. Methods and means of countering the creation and spread of malware are discussed.	Introduction to information security	Intrusion prevention and detection systems, Vulnerability identification and analysis
BD	EC	Programming in Java	180	6	4	LO5, LO8	Formation of a system of concepts, knowledge, skills and abilities in the field of modern programming, which includes methods for designing, analyzing and creating software products in the Java language, based on the use of object-oriented methodology.Within the framework of the discipline, active learning methods are used - presentations based on modern multimedia tools, the method of working in small groups, practical analysis of the results.	Fundamentals of algorithmization and programming	Software and mobile application security, WEB application security приложений
BD	EC	Practical web-programming	180	6	4	LO5, LO8	The key aspects of creating websites and applications, the principles of the client-server architecture are considered. Frameworks and libraries are being studied to create interactive interfaces. An understanding of the basics of web security, working with APIs and databases is being formed. Practical skills in developing, testing and debugging web applications are acquired, which allows students to create functional and effective	Fundamentals of algorithmization and programming	WEB application security приложений

							solutions for the network.		
BD	EC	Organization and management of the information security service	180	6	4	LO9	Knowledge about the fundamentals of organizing and managing information protection services is developed. Methods for risk assessment, development of security policies, and incident response procedures are discussed. Approaches to creating effective information protection systems and managing information resources within an organization are studied.	Computer information protection technologies	Security control systems, Industrial practice 1
BD	EC	Data security management models and systems	180	6	4	LO9, LO10	The basic principles of access control, encryption methods, and information security technologies are considered. Knowledge is being formed about models and systems that ensure data security.Data security management systems (DBMS), their architecture and functionality to ensure the protection of confidential information are being studied.	Databases and their security	Security control systems, Vulnerability identification and analysis
Professional module									
PD	EC	Security control systems	150	5	5	LO9	Knowledge about security control systems and their role in ensuring information protection is developed. The main types of systems, such as intrusion detection and prevention systems (IDS/IPS), as well as security monitoring and analysis tools, are discussed. Methods for assessing and managing vulnerabilities and strategies for incident response are studied.	Intrusion prevention and detection systems	Industrial practice 2/ Pre-graduation practice
PD	EC	Vulnerability identification and analysis	150	5	5	LO3, LO6, LO9	The discipline focuses on studying the methods and tools used to detect vulnerabilities in software, systems, and networks. The course covers the theoretical foundations of information security, as well as practical aspects related to vulnerability analysis and the development of strategies for remediation. An overview of popular tools, such as Nessus, Burp Suite, and Metasploit, is provided, along with their application in practice.	Intrusion prevention and detection systems	Industrial practice 2/ Pre-graduation practice

PD	EC	Biometrics and neural networks	150	5	5	LO5	The discipline studies technologies and methods to identify and authenticate an individual based on unique biometric characteristics such as fingerprints, facial recognition and irises. Issues under consideration: Static and dynamic biometrics. Artificial neural networks. Classification, areas of application. Neural network learning algorithms. Errors of the first and second kind. Neural network models for biometric image recognition.	Python programming language	Industrial practice 2/ Pre-graduation practice
PD	EC	Big data analysis (Big Data)	150	5	5	LO1	Professional competencies are being formed in the field of developing and using systems for processing and analyzing large amounts of data, performing data analysis and interpreting results, choosing a suitable big data analysis tool. The discipline considers methods of analyzing and storing large amounts of data, stages of the life cycle of big data processing, ways to organize storage and access to big data.	Python programming language	Industrial practice 2/ Pre-graduation practice
Data analytics and additional educational programme (Minor) module									
PD	EC	Information Security Event Monitoring	90	3	3	LO2, LO8	The course focuses on methods for collecting, processing, and analyzing information security events. It covers approaches to identifying threats and incidents in information systems, monitoring security events, and ensuring the protection of information resources.	Introduction to information security	Security control systems, Vulnerability identification and analysis
PD	EC	Minor 1	90	3	3	LO8, LO9	The Program Is Aimed at Developing Additional Professional Competencies in the Field of Development, Management, and Application of Intelligent Systems, Providing Interdisciplinary Training for Students, In-Depth Mastery of End-to-End Digital Technologies, and a Significant Expansion of Their Professional Opportunities and Competitiveness in Various High-Tech Sectors of the Modern Economy.	Introduction to information security	Minor 2
PD	EC	Information Systems	90	3	4	LO3,	The course is aimed at studying methods for	Introduction to	Vulnerability

		Security Analysis				LO4	assessing the security level of information systems, identifying vulnerabilities, and analyzing threats. It covers approaches and tools used to ensure information systems security.	information security	identification and analysis, Industrial practice 1
PD	EC	Minor 2	90	3	4	LO6, LO10	The Program Ensures the Formation of Additional Professional Competencies in the Field of Modern Digital and Engineering Technologies, Including the Development and Operation, Processing of Spatial Data and the Integration of Intelligent Control Systems in Various Subject Areas.	Minor 1	Minor 3
PD	EC	Business communications	90	3	5	LO12	The Discipline "Business Communications" Is Aimed at Developing Effective Business Communication Skills in a Professional Environment. The Course Covers Key Aspects of Verbal and Non-Verbal Communication, Principles of Business Correspondence, Negotiation, Presentations and Teamwork.	Green economy and sustainable entrepreneurship	Industrial practice 2/ Pre-graduation practice
PD	EC	Minor 3	90	3	5	LO5, LO8, LO10	The Program Is Aimed at Developing Skills in Effective Business Communication, Including Negotiations, Business Correspondence, Public Speaking, and Intercultural Interaction Using Modern Digital Tools, Team Management, and Cloud-Based Collaborative Services, Ensuring the Cultivation of a High Level of Professional Ethics and Soft Skills for Successful Integration into the Global Business Environment.	Minor 2	Industrial practice 2/ Pre-graduation practice
TOTAL			**1680**	**56**					