Institute of Technical Automation and Information TechnologiesКафедра "Cybersecurity, information processing and storage"

EDUCATIONAL PROGRAM

"7M06303 - Integrated information security"

(the cipher and the name of the educational program)

Code and classification of the field of education:
7M06 Information and communication technologies
Code and classification of training areas: 7M063 Information Security
Group of educational programs: M095 Information Security
NRK Level: 7
ORC Level: 7
Duration of study: 1 years
Volume of credits: 60 credits

Almaty 2025

The educational program "7M06303 - Integrated information security" was approved at a meeting of the Academic Council of KazNTU named after K.I.Satpayev.
Protocol No. №10 of "__06__" ___03___ 2025
Reviewed and recommended for approval at a meeting of the Educational and Methodological Council of Kazntu named after K.I.Satpayev.
Protocol No. №3 of "__20__" ___12___ 2024

The educational program "7M06303 - Integrated information security" was developed by the academic committee in the direction "7M063 Information security"

Ф.И.О.	Last name first name patronymic	Post	Place of work	Signature
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Oglavlanie

List of abbreviations and designations

EP – Educational program
BC – Basic competencies
PC – Professional competencies
LO – Learning outcomes
MOOC – Massive open online courses
NQF – National Qualifications Framework
IQF – Industry Qualifications Framework
IS – Information security
ICT – Information and communication technologies
IT – information Technology

1. Description of the educational program

The educational program 7M06303 “Comprehensive information security” is aimed at training master’s students in a specialized field. The program includes basic and specialized disciplines with the achievement of relevant competencies, as well as various types of internships (production practice, experimental research and internship).

The professional activities of masters are aimed at the field of information protection and security, namely the comprehensive provision of information security and engineering and technical protection of information.

Training of specialized masters in information security will be carried out according to the updated educational program 7M06303 “Comprehensive information security”. The programs of disciplines and modules of the educational program are interdisciplinary and multidisciplinary in nature, developed taking into account the relevant educational programs of the world's leading universities and the international classifier of professional activities in the field of information security.

The educational program ensures the application of an individual approach to students, the transformation of professional competencies from professional standards and qualification standards into learning outcomes and ways to achieve them.

The educational program was developed based on an analysis of the labor functions of an information security administrator, information security auditor, and information security engineer, as stated in professional standards.

The main criterion for completing studies in master's programs is the mastery of all types of educational and professional activities of the master's student.

Upon successful completion of the full course, the student is awarded a Master of Engineering and Technology degree in the educational program 7M06303 “Comprehensive information security.”

A graduate can perform the following types of work:

- design and engineering;
- production and technological;
- experimental research;
- organizational and managerial;
- operational.

Representatives of Kazakh companies and associations, specialists from departmental structures in the field of protection and security participated in the development of the educational program.

2. The purpose and objectives of the educational program

Purpose of the OP: Training highly qualified specialists who can solve problems planning information security audit work, identifying and fixing vulnerabilities, monitoring and investigating information security incidents

OP tasks:

Training of highly qualified specialists who can solve the - planning of information security audit work following tasks:

- planning work on information security audit;
- organizational support for IS audit;

- carrying out an analysis of the compliance of design, operational and technical documentation on information security with the requirements in the field of ICT and information security support for the object of the information security audit;
- analysis of the current state of security of the IS audit object;
- identification and elimination of vulnerabilities;
- monitoring and investigating information security incidents;
- development of a model of threats to information security in enterprises;
- development of technical specifications for the creation of an information security system.

The master's degree in educational program 7M06302 "Comprehensive information security" is focused on independently determining the goals of professional activity and choosing adequate methods and means to achieve them, carrying out innovative activities to obtain new knowledge. In addition, it is focused on the organization, design, development, management and audit of applied information protection and security systems for all sectors of the economy, government organizations and other areas of activit.

3. Requirements for the evaluation of learning outcomes of the educational program

The educational program was developed in accordance with the State mandatory Standards of higher and Postgraduate Education, approved by the Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2 (registered in the Register of State Registration of Regulatory Legal Acts under No. 28916) and reflects the learning outcomes on the basis of which curricula are developed (working curricula, individual curricula of students) and working curricula in disciplines (syllabuses). Mastering disciplines of at least 10% of the total volume of credits of the educational program using MOOC on the official platform https://polytechonline.kz/cabinet/login/index.php/, as well as through the study of disciplines through the international educational platform Coursera https://www.coursera.org/.

Evaluation of learning outcomes is carried out according to the developed test tasks within the educational program in accordance with the requirements of the state mandatory standard of higher and postgraduate education.

When evaluating learning outcomes, uniform conditions and equal opportunities are created for students to demonstrate their knowledge, skills and abilities.

When conducting an interim certification in an online form, online proctoring is used.

4. Passport of the educational program

4.1. General information

№	Field name	Note
1	Code and classification of the field of education	7M06 Information and Communication Technologies
2	Code and classification of training areas	7M063 Information security
3	Group of educational programs	M095 Information security
4	Name of the educational program	7M06303 - Integrated information security
5	Brief description of the educational program	Professional activities of graduates include: education, government and departmental structures, economics and

		industry of the state, and healthcare. The objects of professional activity of graduates of master's programs in the educational program 7M06302 "Comprehensive information security" are: − government bodies; − information security departments and departments of departmental organizations; − information security departments, IT departments and departments of financial organizations; − information security departments, IT departments and departments of industrial enterprises; − departments and departments of information security of government organizations and commercial structures. The main functions of the professional activities of undergraduates are: conducting research in the field of information protection and security; audit, vulnerability analysis and incident investigation in information security systems; design, implementation, operation, administration, maintenance and testing of enterprise information security systems. Areas of professional activity are the following: − design, development, implementation and operation of information security systems; − analysis, testing and identification of system vulnerabilities; − information security audit
6	The purpose of the Educational program	Training highly qualified specialists who can solve problems planning information security audit work, identifying and fixing vulnerabilities, monitoring and investigating information security incidents
7	Type of educational program	New EP
8	The level of the NRK	7
9	ORC Level	7
10	Distinctive features of the Educational program	No
11	List of competencies of the educational program:	Graduates of the profile master's degree, must: 1) have an idea: – contradictions and socio-economic consequences of globalization processes : – on professional competence in the field of information protection and security; – about the technology of virtualization of resources and platforms; – on the intellectualization of information security tools; – about database protection technologies; – about cryptographic information protection algorithms; – about big data analysis. 2) know: – algorithms for cryptographic protection of information; – information security standards and IT security assessment criteria; – resource and platform virtualization technologies and virtualization systems from leading manufacturers; – threats and risks of virtualization systems, principles of

		building hypervisors and their vulnerabilities; – organization of IP networks, structure of IP packets and IP protocols; – internal organization of OS media; – methods and means of storing key information and encryption; – varieties and principles of authentication; – database protection technologies and methods of designing secure databases; – organization of the database protection and security system; – methods and tools of active audit. 3) be able to: – to use the acquired knowledge for the original development and application of ideas in the context of experimental research; – critically analyze existing concepts and approaches to the analysis of processes and phenomena; – integrate knowledge gained in different disciplines to solve research problems in new unfamiliar conditions; – by integrating knowledge to make judgments and make decisions based on incomplete or limited information; – to carry out information-analytical and information bibliographic work with the involvement of modern information technologies; – to think creatively and creatively approach the solution of new problems and situations; – be fluent in a foreign language at a professional level that allows you to conduct research; – summarize the results of research and analytical work in the form of a dissertation, an article, a report, an analytical note, etc.; – apply algorithms for cryptographic protection of information; – apply IS standards and conduct an IT security assessment; – apply virtualization systems from leading manufacturers; – identify threats and risks of virtualization systems; – apply methods and means of storing key information and encryption; – apply database protection technologies and secure database design methods; – organize a database protection and security system; – apply methods and tools of active audit; – apply big data analysis tools. 4) have skills: – use of modern information technologies; – professional communication and intercultural communication; – correct and logical formalization of their thoughts in oral and written form; – organization and protection of database security; – conducting an information security audit; – application of algorithms for cryptographic protection of information; – identifying threats and countering them; – working with Big Data;

		– expanding and deepening the knowledge necessary for daily professional activities and continuing education in doctoral studies. 5) be competent: – in the implementation of projects and research in the professional field; – in the organization of information security systems; – in conducting an information security audit; – in ensuring the information security of the organization; - in ways to ensure constant updating of knowledge, expansion of professional skills and abilities
12	Learning outcomes of the educational program:	**ON1.** To apply in practice the knowledge of fundamental and applied sections of disciplines that determine the focus (profile) of the Master's degree program **ON2**. The ability to conduct independent research, including the skills and abilities of analysis, synthesis, evaluation, and obtaining original scientific results that contribute to the development of information security **ON3**. Independently acquire, comprehend, structure and use new knowledge and skills in professional activities, develop their innovative abilities to create an integrated stable protected infrastructure of organizations. **ON4.** Apply virtualization technologies for resources and platforms, having knowledge of the principles of organizing the safe use of virtualization systems and cloud technologies. Develop and manage software automation tools for big data processing. **ON5.** Apply database protection technologies and secure database design methods, organize a database protection and security system, and use big data analysis tools **ON6.** Analyze threats and develop information security systems in an organization using cryptographic protection algorithms **ON7.** Lead a team in the field of their professional activities, tolerantly accepting social, ethnic, religious and cultural differences. I am ready to communicate orally and in writing in a foreign language to solve the tasks of professional activity for partnership in the interests of sustainable development. **ON8.** Apply cryptographic information protection algorithms and information security standards. The ability to conduct an audit to determine the level of information security and to implement criteria for assessing the security of information technology. **ON9.** Demonstrates proficiency in computer incident investigation tools. Applies data leakage prevention systems
13	Form of training	full – time. online
14	Duration of training	1 years
15	Volume of loans	60 credits
16	Languages of instruction	Kazakh, Russian,
17	Academic degree awarded	Master of Technical Sciences
18	Developer(s) and authors:	Aitkhozhaeva E.Zh., Satybaldieva R.Zh.,

4.2. The relationship between the achievability of the formed learning outcomes according to the educational program and academic disciplines

№	Name of the discipline	Brief description of the discipline	Number of credits	Generated learning outcomes (codes)								
				NO1	NO2	NO3	NO4	NO5	NO6	NO7	NO8	NO9
The cycle of basic disciplines The university component												
1	Foreign language (professional)	The purpose of the course is to improve and develop foreign language communication skills in the professional and academic fields. Course content: general principles of professional and academic intercultural oral and written communication using modern pedagogical technologies (round table, debates, discussions, analysis of professionally oriented cases, design).	2			v				v		
2	Management	The purpose of the discipline is to form a scientific understanding of management as a type of professional activity; to master the general theoretical principles of managing socio-economic systems; to master the skills and practical solutions to management problems; to study the world experience of management, as well as the specifics of Kazakhstani management, and to teach students how to solve practical issues related to managing various aspects of organizations.	2			v				v		
3	Psychology of management	Objective: To acquire skills in making strategic and managerial decisions, taking into account the psychological characteristics of the individual and the team. Contents: the modern role and content of psychological aspects in management activities, methods of improving psychological literacy, the composition and structure of management activities, both at the local and foreign levels, the psychological peculiarity of modern managers.	2			v				v		
The cycle of basic disciplines Component of choice												
4	Security of	The purpose of mastering the discipline is to study the	4	v			v	v				

	virtualization and cloud technology systems	security issues of cloud technologies, sources of threats in cloud computing. The course is aimed at studying cloud deployment models: public, private, hybrid clouds, cloud technology models, features and characteristics of cloud computing, information security standards in the field of cloud technologies and virtualization systems, cloud computing security tools, encryption, VPN networks, authentication, user isolation.										
5	Python for solving information security problems	The course is aimed at studying the issues of solving high-level mathematical and technical problems using the NumPy and SciPy packages, and data analysis using the Pandas package. Promotes the development of skills in working with information security-related data: loading, filtering, transformation, analysis and interpretation of data using well-known models of classification, clustering, regression, etc. The basic methods of working with matrices and matrix operations are studied. Data visualization tools are being studied.	4	v	v	v						
The cycle of profile disciplines The university component												
6	Organization of database protection and security	Security aspects and criteria, security policy. Threats to data security. Database protection and security, data integrity and reliability. Methods and means of data protection and protection. Develop a secure database. CASE-design tools. Database administration tools. Impressions as tools for improving data security. The impact of cursors on database security. Transaction management. Stored procedures. Triggers. Mandatory and discretionary DBMS access management. Role and reports. DBMS monitoring and auditing. Cryptographic tools for database protection. Data replication and recovery. Highly trained tools.	5	v	v			v				
7	Organization of information security systems	The concept of information security systems. Standards of information security systems. Select an object to organize the system. Threat analysis and security	5		v						v	v

		software development. Administrative and procedural levels of information security. Analysis and selection of information security methods. Provision and evaluation of facilities										
8	Management of IT projects and information risks	The purpose of mastering the discipline is to form knowledge, skills and abilities in the field of risk management of IT projects, theoretical and practical mastery of modern risk analysis and assessment tools, study the requirements for the development of documentation on risk identification and assessment, familiarization with the principles and methods of risk management to improve business processes and IT infrastructure of the enterprise.	5		v				v		v	
The cycle of profile disciplines Component of choice												
9	Information Security audit	Information Security audit Information security management. Information security audit. Basic terms, definitions, concepts and principles in the field of information security audit. The main areas of information security audit. Types and objectives of the audit. The main stages of the security audit. A list of the source data required for conducting a security audit. Assessment of the current state of the information security system. Assessment of the security level. Risk analysis, assessment of the security level, development of security policies and other organizational and administrative documents for information protection. International standards and best practices for conducting OTT audits.	5	v	v						v	
10	Risk management in cybersecurity	Risk management in cybersecurity The program of the training course "Risk Management in Cybersecurity" is aimed at studying international and national standards of risk management in cybersecurity, methods of risk identification and management, practical application of standards and methods, and the study of specialized software packages for risk assessment.	5				v					v
11	Big Data and data	The purpose of the course is to develop students'	5		v		v	v				

	analysis	professional competence in the development and use of systems for processing and analyzing large amounts of data. The content of the discipline examines the methods of analyzing and storing large amounts of data, the stages of the life cycle of big data processing, the languages most suitable for processing and analyzing big data, and ways to organize storage and access to big data.										
12	Machine Learning & Deep Learning	The course focuses on deep learning models. As an area within machine learning, deep learning models illustrate the quantitative-qualitative transition. New models and their properties require separate study and practice of adjusting the meta-parameters of such models. This course covers the basics of deep learning, neural networks, convolutional networks, RN, LSTM, Adam, Dropout, BatchNorm, and Xavier/Hernandez initialization.	5		**v**		**v**					

5. Curriculum of the educational program