

K.I.SATPAYEV KAZAKH NATIONAL RESEARCH

TECHNICAL UNIVERSITY

The State mandatory standard of Technical and vocational education, approved by the Decree of the Government of the Republic of Kazakhstan dated August 23, 2012 No. 1080 (as amended as of 08/15/2017). Footnote, Item 1 as amended by the Resolutions of the Government of the Republic of Kazakhstan dated 25.04.2015 No. 327 (effective from 01.09.2016), dated 13.05.2016 No. 292 (effective from 01.09.2017). Footnote, Appendix 4 - as amended by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated 05.05.2020 No. 162 (effective from 13.05.2020).

GRADUATE MODEL

6B06301 - "INFORMATION SECURITY"

Degree of the educational program: Bachelor of Engineering and Technology

- CC3005 guidelines for the development of training programs for IT specialists;
- SF3004 training manual for training specialists of university programs in the field of software engineering;
- Recommendations of the International Association of Computing Machinery (IACM) on Computer science curricula (CC3005 series).
The Bachelor of Engineering and Technology degree is awarded to those students who successfully complete the bachelor's degree course in the educational program "6B06301 Information Security".

Objects from professional activity :

- organization and technology of information protection;
- cryptography;
- security of telecommunication systems;
- organization of information protection of automated control systems;
- organization and design of database protection;
- organization of comprehensive information protection.

Competencies of undergraduate graduates

Code	Type of Competence	Description of Competence	Competence result	Responsible
GENERAL				
Almaty 2022				

(All training is implied with possible additional training depending on the level of knowledge)

This educational program **6B06301 «Information Security»** has been developed on the basis of the main regulatory documents:

- The State mandatory standard of Technical and vocational education, approved by the Decree of the Government of the Republic of Kazakhstan dated August 23, 2012 No. 1080 (as amended as of 08/15/2017). Footnote. Item 1 as amended by the Resolutions of the Government of the Republic of Kazakhstan dated 25.04.2015 No. 327 (effective from 01.09.2016); dated 13.05.2016 No. 292 (effective from 01.09.2017). Footnote. Appendix 4 - as amended by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated 05.05.2020 No. 182 (effective from 15.05.2020).
- Industry Qualification Framework (ORC). Industry: information and communication technologies. Approved by Protocol No. 1 of the December 20, 2016 meeting of the Industry Commission in the field of information, informatization, communications and Telecommunications.
- Law of the Republic of Kazakhstan "On Education" dated July 27, 2007 No. 319-III SAM;
- IEEE SWEBOK pooling of knowledge on software engineering;
- CC2005 guidelines for the development of training programs for IT specialists;
- SE2004 training manual for training specialists of university programs in the field of software engineering;
- Recommendations of the International Association of Computing Machinery (ACM) on Computer science curricula (CC2005 series).

The Bachelor of Engineering and Technology degree is awarded to those students who successfully complete the bachelor's degree course in the educational program "6B06301 Information Security".

Objects from professional activity :

- organization and technology of information protection;
- cryptography;
- security of infocommunication systems;
- organization of information protection of automated control systems;
- organization and design of database protection;
- organization of comprehensive information protection.

1 Competencies of undergraduate graduates

Code	Type Competence	Description Competence	of	Competence result	Responsible
GENERAL					
(Full training is implied with possible additional training depending on the level of knowledge)					

G1	Communication skills	<ul style="list-style-type: none"> - Fluent monolingual oral, written and communication skills - Ability to communicate fluently in a second language - Ability to use communicative communication in various situations - there are the basics of academic writing in your native language - diagnostic test for the language level 	<p>Full 4-year study with a minimum of 240 academic credits (including 120 academic credits of the contact class) with the possible translation of credits into a second language, where students have an advanced level.</p> <p>The language level is determined by passing a diagnostic test.</p>	Department of Kazakh and Russian Languages, Department of English
G2	Mathematical literacy	<ul style="list-style-type: none"> - Basic mathematical thinking at the level of communication - the ability to solve situational problems based on the mathematical apparatus of algebra as well as the principles of mathematical analysis - diagnostic test for mathematical literacy in algebra 	<p>Complete 4-year study with a minimum of 240 academic credits (including 120 academic credits of the contact class). If the diagnostic test is positive, the math level is 1, if negative, the algebra level and the beginning of the analysis</p>	Department of Mathematics
G3	Basic literacy in natural sciences	<ul style="list-style-type: none"> - a basic understanding of the scientific picture of the world with an understanding of the essence of the basic laws of science - understanding basic hypotheses, laws and methods, drawing conclusions, and error estimation 	<p>Complete 4-year study with a minimum of 240 academic credits (including 120 academic credits of the contact class). with a positive result of the diagnostic test, Physics level 1, General Chemistry, with a negative result - the level of the Beginning of physics and the Basics of chemistry</p>	Departments in the areas of natural sciences

SPECIALIZED

(it assumes reduced training due to credit, depending on the level of knowledge on competencies for graduates of 12-year schools, colleges, universities, including humanities and economics)

S1	Communication skills	<ul style="list-style-type: none"> - Fluent bilingual oral, written and communication skills - ability to communicate fluently in a third language - writing skills and abilities from various styles as well as genres - skills from deep understanding as well as interpretation from your own work of a certain level from complexity (composition) - basic aesthetic as well as theoretical literacy as a condition for full perception as well as interpretation from the original text 	Full credit translation by language (Kazakh and Russian)	Department of Kazakh and Russian Language
S2	Mathematical literacy	<ul style="list-style-type: none"> - special mathematical thinking using induction and deduction, generalization and concretization, analysis and synthesis, classification and systematization, abstraction and analogy - ability to formulate, substantiate and prove statements - Application of general mathematical concepts, formulas and expanded spatial perception of mathematical problems - complete understanding of the basics of mathematical analysis 	Transfer of credits in the discipline of Mathematics (Calculus) I	Department of Mathematics
S3	Special literacy in natural sciences (physics, chemistry, biology, geography)	<ul style="list-style-type: none"> - A broad scientific perception of the world, assuming an understanding of natural phenomena 	Transfer from Credits to Physics I, General Chemistry, General Biology, Introduction to Geology, Introduction to	Departments in the areas of natural sciences

		<ul style="list-style-type: none"> - critical perception for understanding into phenomena from into the surrounding world - cognitive abilities to formulate a scientific idea about the forms of existence of matter, its interaction with nature 	Geodesy; Practice Preparation, etc.	
S4	English language	<ul style="list-style-type: none"> - readiness for further independent study of the English language in various directions - willingness to gain experience in project and research work using English 	Translation of English language credits from academic to professional level (up to 15 credits)	Department of English
S5	Computer skills	<ul style="list-style-type: none"> - Basic programming skills in one modern language - use of software and applications for teaching various disciplines 	Credit transfer in the discipline Introduction to information communication technologies, Information and communication technologies	Department of Software Engineering
S6	Socio-humanitarian competencies and behavior	<ul style="list-style-type: none"> - understanding and awareness of the responsibility of each citizen for the development of the country and the world - the ability to discuss ethical and moral aspects in society, culture and science 	Transfer of credits on the Modern history of Kazakhstan (except for the state exam)	Department of Social Sciences
		<ul style="list-style-type: none"> - критическое понимание и способность вести дебаты по поводу современных научных гипотез и теорий 	Transfer of credits in philosophy and other humanities	
PROFESSIONAL (meaning shortened training due to credits offset, depending on the level of knowledge on competencies for graduates of colleges, secondary schools, universities)				
P1	Professional competence	<ul style="list-style-type: none"> -critical perception and deep understanding of professional competencies at level 5 or 6 	Transfer of credits in the main professional disciplines, including introduction to the specialty, engineering	Department of Software Engineering

		- ability to discuss and discuss professional issues in the studied program	ethics, technology of robotic production, technological automation objects, theoretical foundations of electrical engineering, technical and logical measurements and devices, mathematical foundations of control theory, electronic automation devices.	
P2	General engineering competencies	- basic general engineering skills and knowledge, the ability to solve general technical tasks and tasks - be able to use application software packages for processing experimental data, solving systems of algebraic and differential equations	Credit transfer in general technical disciplines (engineering graphics, descriptive geometry, fundamentals of electrical engineering, fundamentals of microelectronics.)	Department of Software Engineering
P3	Computer engineering competence	- basic skills of using computer programs and software complexes to solve general technical problems	Transfer of credits in the discipline of computer graphics, computer modeling and programming in the MatLab environment.	Department of Software Engineering
P4	Socio-economic competence	- critical understanding and cognitive ability to reason about modern social and economic problems - basic ideas about the economic assessment of research objects and the profitability of projects.	Transfer of credits in socio-humanitarian and technical-economic disciplines to the credit of the elective cycle	Department of Software Engineering

– 2 Characteristics of the graduate's professional activity

- Graduates of the educational program "6B06301 Information Security" have competencies in the following areas:

knowledge:

– about the basic laws of the functioning of systems and the possibilities of their system analysis;

– on modern methods of research, optimization and design of computer systems for processing critical information and their support;

– about modeling automation;

- about the possibilities of information technologies and ways of their application in industry, scientific research, organizational management and other areas of information security;
- trends in the development of electronics, promising circuit solutions in the field of computer technology to ensure information security;
- about the current state and trends in the development of architectures of computing systems and networks;
- about the architecture and the possibilities of microprocessor technology;
- about the use of packages and libraries in programming, about modern algorithmic languages, their scope and features;
- about cryptographic protection of information.

practical skills:

- formulation of the problem, the use of models, methods and means of information technology in the creation of critical information processing and management systems;
- use of modeling languages for research and design of critical information processing systems;
- analysis of electrical circuits under various influences in the time and frequency domains analytically and numerically on a computer;
- programming in modern operating environments and database management environments;
- analysis of information security conditions and selection of technical and organizational measures to ensure information security at the stage of design, manufacture and operation of critical information processing facilities;
- the use of basic models, methods and tools used in systems to automate the solution of information security problems;
 - using database technology for secure processing of critical information;
 - work with the means of cryptographic protection of information.

skills:

- to use a formal apparatus for analyzing organizational, functional and technical structures of information security systems, to determine the composition of tasks solved by the system;
 - apply system modeling methods in the study and design of systems, schemes of modeling algorithms, languages modeling and application software packages for modeling discrete systems;
- to use the methods of information technology and its tools in the development and design of information security systems;
 - design and secure databases;

– to use methods of analysis and synthesis of electronic circuits, microprocessor tools in the creation of hardware and software systems for information protection;

– use the capabilities of computer systems in the construction of information security systems;

– apply methods and tools for developing algorithms and programs, structural programming techniques, ways to write an algorithm in a high-level language, ways to debug, test and document programs;

– use system software tools, operating systems and shells that serve service programs;

– use threat models, information attacks and counteraction to them;

– use means of cryptographic protection of information.

4 List of positions for graduates

– Information security specialist in automated systems;

– Specialist in the security of computer systems and networks.

– Information Security Administrator

– Information Security Auditor

– Information Security Engineer

– Service Security Specialist

– Security Specialist (ICT)

– Information security specialist

– Information security specialist

– Specialist criminalist in digital technologies

– Data encryptor

Discussed at the meeting of the Department "Cybersecurity, information processing and storage"

" 18 " 10 2022 G. Protocol No. 2

Head of the Department "Cybersecurity, information Processing and Storage"
R.Zh. Satybaldieva