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MINISTRY OF SCIENCE and HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN  
NJSC "Korkyt Ata Kyzylorda University"



**GRADUATE MODEL**  
**Bachelor's degree in the educational program**  
**6B06149 – "Information systems"**

Kyzylorda, 2023

## **CONTENT**

Introduction

1 Description of the OP

2 Components in the formation of the graduate model of the educational program

2.1 Objectives of the Educational program

2.2 Objectives of the Educational Program

2.3 General and professional competencies

2.4 Matrix of correlation of learning outcomes of the educational program with the competencies being formed

2.5 Personal qualities of a social work specialist

Conclusions

## **INTRODUCTION**

The graduate model of Korkyt Ata University is a comprehensive image of the result of studying at the university at all levels of education. The graduate model is recommended for use in the development of educational programs.

The development of a graduate's competence model is an important prerequisite for the implementation of the main directions of the Bologna process and a requirement of the modern labor market. The competence model of a graduate (bachelor) is designed to answer the question of what professional tasks a specialist of a certain rank (position), of a particular profile should be able to solve. The formation of a modern graduate model that meets the needs of all interested parties is the main strategic goal of Korkyt Ata University and is provided with the necessary resources for the educational process, including personnel, educational, methodological, informational and logistical support. The University conducts a targeted personnel policy and systematic improvement of the material and technical base of the university to ensure the quality of training of a bachelor graduate in demand in the labor market.

### **1. DESCRIPTION DESCRIPTION**

The educational program provides training for specialists involved in ensuring the security of systems and network technologies. In particular, he is trained in the field of methods and means of cryptographic information protection, computer technologies for information protection, development and design of cryptographic information protection tools, various methods and means of technical information protection, organization and management of information security services, Organization of computing systems and networks, administration, security of cloud technologies.

### **2. THE CONSTITUENT COMPONENTS IN THE FORMATION OF THE GRADUATE MODEL OF THE EDUCATIONAL PROGRAM**

The key components of the formation of the graduate Model of the educational program include information about the goals and objectives of the educational program, objects, types and directions of professional activity, the competence model of the specialist (Appendix 1), including descriptors, a variety of competencies in accordance with the educational program, the results of the educational program.

#### **2.1 Objectives of the Educational Program:**

Training of competitive specialists in the labor market in the field of IT technologies and programming technologies.

#### **2.2 Objectives of the Educational Program:**

Graduates are able to work in computer and information services of government agencies, industrial enterprises, financial organizations, research institutions, design organizations, educational institutions, commercial companies and firms- monitoring and analyzing the effectiveness of information security software in operating systems and networks;

- control of the correct operation of hardware and software protection and system administration;
- identification of threats, vulnerabilities and risks in the field of Internet of Things security;
- development, design and support of the organization's network security tools;

- assessment of the security level of the organization's computer systems and networks.

### 2.3 General and professional competencies

General:

- demonstration of knowledge and understanding in the field under study, including elements

of advanced knowledge in this field;

- apply this knowledge and understanding at a professional level;
- formulation of arguments and problem solving in the field under study;
- to collect and interpret information to form judgments

Social, ethical and scientific considerations;

- provide information, ideas, problems and solutions to specialists, non-specialists;
- proficiency in working with modern technology, the ability to use information technology in the field of professional activity;
- mastering the skills of obtaining new knowledge necessary for everyday life
- continue professional activity and education in the master's degree;
- knowledge of general concepts of science and scientific thinking.

Profile:

- to have an idea of the trends and prospects for the development of modern information technologies;
- to understand the essence and importance of information in the development of modern

### 2.1 Matrix of correlation of learning outcomes of the educational program with the competencies being formed

Competencies	LO1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8
GEC1	+							
GEC 2	+							
GEC 3	+							
GEC 4	+							
GEC 5	+							
GEC 6	+							
GEC 7		+						
GEC 8	+							
SC1				+				
SC2				+				
SC3			+					
SC4			+					
SC5			+					
SC6			+					
SC7				+				
SC8				+				

SC9			+					
SC10				+				
SC11					+			
SC12					+			
SC13				+				
SC14					+			
SC15			+					
SC16					+			
SC17					+			
SC18						+		
SC19					+			
SC20				+				
SC21						+		
SC22					+			
SC23					+	+		
SC24					+			
SC25			+			+		
PC1					+			
PC2					+			
PC3			+			+		
PC4							+	
PC5						+		
PC6					+		+	
PC7			+					
PC8				+		+		
PC9								+
PC10								+

LO1	Demonstrate the ability and willingness to apply the acquired natural science, humanitarian, socio-economic, entrepreneurial, legal, environmental knowledge, life safety culture and leadership qualities in various spheres of life
LO2	Knows the software development process. Can analyze requirements and integrate software modules and components. Has a deep knowledge of modern methods and tools for designing information systems and technologies for various purposes
LO3	Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
LO4	Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database.
LO5	Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
LO6	Ability to use modern information technologies, manage information using business application programs; use network computer technologies, databases and application packages in their subject area
LO7	Knows the techniques and process of creating software test scenarios. It can define approaches to testing individual modules, including testing levels and criteria for input and output data values that ensure effective software testing.
LO8	Owns the tools for data processing and analysis in order to justify the design decisions

made. Performs the formulation and execution of experiments to verify the correctness of software, information systems and their effectiveness. Is able to perform work on the creation, modification, implementation and maintenance of information systems and manage these works; conducts a systematic analysis of the applied sphere
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## **2.4 Personal qualities of an information security specialist**

- Analytical skills: conducting a systematic analysis of information; systematization of information; data comparison; abstracting information; designing the result.
- Diagnostic skills: the ability to structure the information received; implement innovative and combinational processes related to the ability to predict; determine strategic, tactical and operational goals; formulate and solve professional tasks; use positive experience; make managerial decisions; diagnose possible solutions.
- Verbal and non-verbal skills: establishing business relationships with colleagues; cooperation with partners; formulation of professional tasks; mastering oral and written speech; solving non-standard tasks using methods and tools; determining significance in extreme situations.
- Forecasting skills: confidence in their actions in accordance with the assessment of everything that is happening; determination, management, information modeling, energy mobilization, perseverance, activity, ability to bear the load, as a condition of perseverance in performing complex tasks.
- Correctional skills: self-analysis, self-correction; determination of trajectories of self-development and self-education; understanding of one's professional and personal capabilities.

Types of professional activity of the bachelor in the field of information and communication technologies according to the educational program 6B06149-"information systems" :

- Architects of IT projects;
- Business Analyst;
- Information systems designer;
- Administration of information Systems;
- Specialist in the implementation of information systems;
- User Interface designer;
- Developers of database management systems;
- Advisor in the field of information systems;
- Information Technology Sales Manager;
- Programmer in different categories.

## **CONCLUSIONS**

In market conditions, universities are beginning to pay more attention to the quality of graduates: a graduate is the result of university education entering the labor market. And it has to be competitive. To prepare graduates in demand on the market, it is necessary to form a comprehensive portrait of him, a certain matrix of characteristics. The formation of educational programs with an understanding of the main advantages, characteristics,

competencies of graduates needed by employers, the creation of infrastructure, the transition to the creation of an effective modern university based on the use of new learning formats.

### The graduate's competence model

Module	DDB (Dublin Descriptors of bachelor)	Emerging competencies			Planned learning outcomes
		general education competencies	basic competencies	professional competencies	
1	2	3	4	5	6
M1	DDB1 DDB2 DDB3 DDB4 DDB5	GEC 1, GEC 2, GEC 3, GEC 4, GEC 5			LO 1 Demonstrate the ability and willingness to apply the acquired natural science, humanitarian, socio-economic, entrepreneurial, legal, environmental knowledge, life safety culture and leadership qualities in various spheres of life
M1	DDB1 DDB2 DDB3 DDB4 DDB5	GEC 6			LO 2 Knows the software development process. Can analyze requirements and integrate software modules and components. Has a deep knowledge of modern methods and tools for designing information systems and technologies for various purposes LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
	DDB1 DDB2 DDB3 DDB4 DDB5	GEC 7, GEC 8			LO 1 Demonstrate the ability and willingness to apply the acquired natural science, humanitarian, socio-economic, entrepreneurial, legal, environmental knowledge, life safety culture and leadership qualities in various spheres of life
M3	DDB1 DDB2 DDB3 DDB4 DDB5		SC 1		LO 4 Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database.
	DDB1		SC 2,		LO 4



	DDB2 DDB3 DDB4 DDB5		SC 3		Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database. LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 7		LO 4 Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database.
M5	DDB1 DDB2 DDB3 DDB4 DDB5		SC 8		LO 4 Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database.
M4	DDB1 DDB2 DDB3 DDB4 DDB5		SC 9		LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
M3	DDB1 DDB2 DDB3 DDB4 DDB5		SC 12		LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 16		LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
M6	DDB1 DDB2 DDB3 DDB4		SC 23		LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment

	DDB5				
M2	DDB1 DDB2 DDB3 DDB4 DDB5		SC 4		LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
M2	DDB1 DDB2 DDB3 DDB4 DDB5		SC 5		LO 2 Knows the software development process. Can analyze requirements and integrate software modules and components. Has a deep knowledge of modern methods and tools for designing information systems and technologies for various purposes
M4	DDB1 DDB2 DDB3 DDB4 DDB5		SC 10		LO 4 Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database.
M3	DDB1 DDB2 DDB3 DDB4 DDB5		SC 11		LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 13		LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
M6	DDB1 DDB2 DDB3 DDB4 DDB5		SC 14 SC 17 SC 19		LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
M5	DDB1 DDB2 DDB3 DDB4 DDB5		SC 20		LO 4 Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database.

	DDB1 DDB2 DDB3 DDB4 DDB5		SC 24		LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment LO 6 Ability to use modern information technologies, manage information using business application programs; use network computer technologies, databases and application packages in their subject area
M3	DDB1 DDB2 DDB3 DDB4 DDB5		SC 25		LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
M5	DDB1 DDB2 DDB3 DDB4 DDB5		SC 26		LO3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems. LO 6 Ability to use modern information technologies, manage information using business application programs; use network computer technologies, databases and application packages in their subject area
M4	DDB1 DDB2 DDB3 DDB4 DDB5			PC 1	LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
M5	DDB1 DDB2 DDB3 DDB4 DDB5			PC 2	LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment
M6	DDB1 DDB2 DDB3 DDB4 DDB5			PC 3	LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems. LO 6 Ability to use modern information technologies, manage information using business application programs; use network computer technologies, databases and application packages in their subject area
M5	DDB1 DDB2			PC 4	LO 7 Knows the techniques and process of creating software test scenarios. It can define approaches to testing

	DDB3 DDB4 DDB5				individual modules, including testing levels and criteria for input and output data values that ensure effective software testing.
M6	DDB1 DDB2 DDB3 DDB4 DDB5			PC 5	LO 6 Ability to use modern information technologies, manage information using business application programs; use network computer technologies, databases and application packages in their subject area
M7	DDB1 DDB2 DDB3 DDB4 DDB5			PC 6	LO 5 Can apply basic processes, methods and tools for developing information systems and software. Knows the configuration, installation, configuration and maintenance of server equipment LO 7 Knows the techniques and process of creating software test scenarios. It can define approaches to testing individual modules, including testing levels and criteria for input and output data values that ensure effective software testing.
M6	DDB1 DDB2 DDB3 DDB4 DDB5			PC 7	LO 3 Knows the basics of physical theories and principles, physical research methods. He is able to master automatic control systems and methods of compiling and converting their mathematical models, basic methods of analysis and synthesis of linear, nonlinear, discrete, optimal and adaptive systems.
M6	DDB1 DDB2 DDB3 DDB4 DDB5			PC 8	LO 4 Can work with operating systems, network technologies, software development tools and software interfaces, languages and methods of formal specification, database management systems. Knows how to install and configure software. Monitors and manages database backups. Manages the development of the database. LO 6 Ability to use modern information technologies, manage information using business application programs; use network computer technologies, databases and application packages in their subject area
M7	DDB1 DDB2 DDB3 DDB4 DDB5			PC 9 PC 10	LO 8 Owns the tools for data processing and analysis in order to justify the design decisions made. Performs the formulation and execution of experiments to verify the correctness of software, information systems and their effectiveness. Is able to perform work on the creation, modification, implementation and maintenance of information systems and manage these works; conducts a systematic analysis of the applied sphere