Institute of Automation and Information Technologies
Department "Automation and control"

EDUCATIONAL PROGRAM
7M07101 - AUTOMATION AND ROBOTIZATION

code and name of the educational program

Code and classification of the field of education: **7M07 Engineering, manufacturing and construction industries**
Code and classification of areas of study: **7M071 Engineering and Engineering**
Group of educational programs: **M100 Automation and control**
NQF level: **7**
ORC level: **7**
Duration of study: **2 years**
Volume of credits: **120 credits**

Almaty 2023

Educational program **7M07101 - Automatization and Robotization** was approved at the meeting of the Academic Council of KazNITU named after K.I. Satpayev.

Protocol № 3 of «27» 10 2022

Reviewed and recommended for approval at the meeting of the Teaching and Methodological Council of KazNITU named after K.I. Satpayev.

Protocol № 2 of «21» 10 2022

The educational program **«7M07101 - Automatization and Robotization»** has been developed by the academic committee of **«7M071 Engineering and Engineering»**.

FULL NAME	Scientific degree/ academic title	Position	Workplace	Caption
Chairman of the Academic Committee:				
Aldiyarov Nakhypbek	Candidate of Physical and Mathematical Sciences	Head of the Department "Automation and Control"	NAO "Kazakh National Research Technical University named after K.I.Satpayev", cell phone: +77772746301	
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Employers:				
Abdigaliyev Serik		Chief	«HONEYWELL - AUTOMATIC CONTROL SYSTEM LLP»	
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Table of contents

List of abbreviations and symbols

EP	Educational program
LSU	Microprocessor control systems
TP	Teaching practice
IP	Research practice
RFP	Application package

1. Description of the educational program

The educational program (hereinafter EP) is a set of documents developed by the Kazakh National Research Technical University named after K.I.Satpayev andapproved by the Ministry of Education and Science of the Republic of Kazakhstan.

Educational program 7M07101 - Automatization and robotization involves the training of highly qualified specialists in the field of automation, robotics, artificial intelligence and automated control.

The bachelor's degree in the EP " Automatization and robotization " provides for the acquisition of competencies in a wider area: automation, robotics, artificial intelligence and automated control in order to ensure the adaptation of bachelor's graduates to the requirements of the labor market. This EP of the master's program provides for further deepening of the competencies acquired in the bachelor's degree. In this connection, modern innovative disciplines have been introduced into the program.

In the process of mastering the educational program, the Master of Technical Sciences in the field of automation of production processes must acquire the following key competencies:

- will be able to analyze literature data and, on the basis of the analysis, determine and experimentally implement possible ways to modernize automated and robotic systems using new technical solutions.
- will be able to apply appropriate methods of analysis, both qualitative and quantitative, to collect and integrate information in the best possible way.
- demonstrate the skills of teaching in the undergraduate program, working with students and supervising them.
- will be able to conduct independent original research that contributes to the development of science, in accordance with the best practices and industry standards.
- have the skills to create robotic systems and automated technological complexes.
- have professional knowledge in the field of automation, robotization, artificial intelligence and automated control.

Objects of professional activity:

- automation and process control systems;
- robotic systems and complexes;
- teaching college and undergraduate students in special disciplines.

The Master in Automation of Production Processes must solve the following tasks in accordance with the types of professional activity:

in the field of production and technological activities:

- to be a leading engineer, a leading specialist of the production unit for the operation, maintenance, repair and adjustment of technical means of automated control systems for production processes in various industries;

in the field of organizational and managerial activities:

- to be the head of the department for the maintenance and repair of elements,

devices of automated control systems for production processes in various industries;

in the field of experimental research activities:

- to be a leading specialist in conducting experimental studies of industrial automation objects;

in the field of research and teaching activities:

- be a researcher in a scientific laboratory for the research and development of modern automated control systems for production processes in various industries;

-be an undergraduate teacher in special disciplines in the field of automation and robotics;

in the field of design design activities:

- be a leading engineer or chief engineer of a project for the development and design of automated control systems for production processes in various industries.

2. Purpose and objectives of the educational program

Purpose of the EP: The purpose of the educational program is to train undergraduates in basic and specialized disciplines with the achievement of relevant competencies.

Tasks of the EP:

Based on the achievements of modern science, technology and production, to provide knowledge and skills in the field of:

-automation;

-robotics;

-artificial intelligence;

-automated control.

3. Requirements for evaluating the learning outcomes of an educational program

EP 7MO7101 - "Automatization and robotization" ensures that all students achieve the learning outcomes necessary for professional activities. At the end of the program, the student must:

- possess the skills of conducting research and design work on the development of automated control systems for technological processes and robotic technological complexes in various industries.

- freely use the state, Russian and one of the most common foreign languages in professional activities. Fluent in the basics of philosophical, pedagogical, and economic knowledge.

- master the main methods: data mining, descriptive analysis, correlation and regression analysis, classical calculus of variations, matrix description of spatial mechanisms.

- to master the main methods of modern control theory: synthesis of systems with a given dynamics using standard and relay controllers, digital control systems, systems with variable structure, modal control, identification and adaptation and

optimal control.

- possess the skills of describing the kinematics and dynamics of industrial robots, methods of developing software trajectories, developing adaptive and non-adaptive control algorithms for industrial robots.
- to have the skills to create automated process control systems and robotic technological complexes.
- to possess the skills of building microprocessor systems (MSU). To be able to design hardware and software of MSU.
- to know modern technical means of automation and robotics. To master the basics of the practical application of modern automation technology.
- possess the skills of software and stabilizing, optimal and adaptive control and synthesis of intelligent control systems.
- the ability to design modern and reliable blocks and devices, intelligently controlled executive, information-sensor and navigation modules of robotic and automated systems.

4. Passport of the educational program

4.1.General information

No.	Field name	Note
1	Code and classification of the field of education	7M07 Engineering, manufacturing and construction industries
2	Code and classification of areas of study	7M071 Engineering and Engineering
3	Group of educational programs	M100 Automation and control
4	Name of the educational program	7M07101 - Automatization and robotization
5	Brief description of the educational program	Educational program 7M07101 - Automatization and robotization involves the training of highly qualified specialists in the field of automation, robotics, artificial intelligence and automated control.
6	Purpose of the OP	The purpose of the educational program is to train undergraduates in basic and specialized disciplines with the achievement of relevant competencies.
7	OP type	New EP
8	NQF level	7
9	ORC level	7
10	Distinctive features of the OP	No
11	List of competencies of the educational program:	In the process of mastering the educational program, the Master of Technical Sciences in the field of automation of production processes must acquire the following key competencies: - will be able to analyze literature data and, on the basis of the analysis, determine and experimentally implement possible ways to modernize automated and robotic systems using new technical solutions. - will be able to apply appropriate methods of analysis, both qualitative and quantitative, to collect and integrate information in the best possible way. - demonstrate the skills of teaching in the undergraduate program, working with students and supervising them. - will be able to conduct independent original research that contributes to the development of science, in accordance with the best practices and industry standards. - have the skills to create robotic systems and automated technological complexes. - have professional knowledge in the field of automation, robotization, artificial intelligence and automated control.
12	Learning outcomes of the educational program:	PO1 Possess the skills of conducting research and design work on the development of automated control systems for technological processes and robotic technological complexes in various industries. PO2 Freely use the state, Russian and one of the most common foreign languages in professional activities. Fluent in the basics of philosophical, pedagogical, and economic

		knowledge. PO3 Master the main methods: data mining, descriptive analysis, correlation and regression analysis, classical calculus of variations, matrix description of spatial mechanisms. PO4 To master the main methods of modern control theory: synthesis of systems with a given dynamics using standard and relay controllers, digital control systems, systems with variable structure, modal control, identification and adaptation and optimal control. PO5 Possess the skills of describing the kinematics and dynamics of industrial robots, methods of developing software trajectories, developing adaptive and non-adaptive control algorithms for industrial robots. PO6 To have the skills to create automated process control systems and robotic technological complexes. PO7 To possess the skills of building microprocessor systems (MSU). To be able to design hardware and software of MSU. PO8 To know modern technical means of automation and robotics. To master the basics of the practical application of modern automation technology. PO9 Possess the skills of software and stabilizing, optimal and adaptive control and synthesis of intelligent control systems. PO10 The ability to design modern and reliable blocks and devices, intelligently controlled executive, information-sensor and navigation modules of robotic and automated systems.
13	Form of study	full-time
14	Training period	2 years
15	Volume of loans	120 credits
16	Languages of instruction	Kazakh, Russian
17	Awarded Academic Degree	Master of Engineering
18	Developer(s) and authors:	Aldiyarov N.U., Zhanabaeva E.Zh.

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

No.	Name of the discipline	Brief description of the discipline	Amount of credits	Formed learning outcomes (codes)									
				LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10
Cycle of basic disciplines University component													
1	Foreign language (professional)	The course is designed for undergraduates of technical specialties to improve and develop foreign language communication skills in professional and academic fields. The course introduces students to the general principles of professional and academic intercultural oral and written communication using modern pedagogical technologies.	5		v								
2	Psychology of Management	The discipline studies the modern role and content of psychological aspects in managerial activity. The improvement of the psychological literacy of the student in the process of implementing professional activities is considered. Self-improvement in the field of psychology and studying the composition and structure of management activities, both at the local level and abroad. The psychological feature of modern managers is considered.	3		v								
3	History and philosophy of science	The subject of philosophy of science, the dynamics of science, the specifics of science, science and prescience, antiquity and the formation of theoretical science, the main stages of the historical development of science, the features of classical science, non-classical and post-non-classical science, the philosophy of mathematics, physics, engineering and technology, the specificity of engineering sciences, the ethics of science , social and moral responsibility of a scientist and engineer.	3		v								
4	Pedagogy of higher education	Undergraduates will master the methodological and theoretical foundations of higher school pedagogy, plan and organize the processes of teaching and upbringing, master the communicative technologies of subject-subject interaction between a teacher and a master in the educational process of a university.	3		v								
5	Pedagogical practice	Pedagogical practice (TP) is the most important component and integral part of the educational process of undergraduates. The purpose of the PP is the general professional preparation of undergraduates for teaching at the university. The objectives of the pedagogical practice of undergraduates arestrengthening the knowledge, skills and abilities acquired by	6	v									

		undergraduates in the process of studying the disciplines of the master's program. Pedagogical practice is carried out at the graduating department, which trains masters. The terms and duration of the practice are established in accordance with the curricula and the calendar schedule of the educational process.During the period of internship, undergraduates are subject to the internal regulations of the university.											
Cycle of basic disciplines Selectable Component													
6	Modern control theory	The content of the discipline includes the study of modern approaches for the analysis and synthesis of automatic control systems based on the “state space” methodology. The properties of linear and nonlinear systems and methods for their study are considered from a unified positions of the state space method. Provided basic information about systems with variable structure, modal control, identification, adaptation and optimization in control systems.	5				v						
7	Integrated automation technology and management	The task of studying the discipline is to acquire knowledge on effective technologies for modeling automation objects, to study the directions of development of automation tools, fundamentally new methods of process control, computer-integrated production of a new generation, as well as to acquire skills in forming a production automation strategy, the use of modern automation devices to solve control problems, the formation of sets of modern sensors and converters to combine them into a computer-integrated production system.	5						v	v			
8	Data Mining Methods	The discipline considers the most common methods and algorithms of data mining. Special attention is paid to understanding the principles and concepts underlying modern intellectual methods. Using practical examples, the features of data analysis when conducting research in the field of automation and control are considered.	5			v							
9	Intelligent technology in robotics	The course "Intelligent Technologies in Robotics" discusses the main characteristics of robots: load capacity, coordinate movement system, number of degrees of freedom; speed of movement and the magnitude of the stroke of each link, positioning error, method of installation at the workplace, working area of service. Classification and principles of construction of robotic systems. Technological requirements for robotic systems used in enterprises. An actively developing field of artificial intelligence. Includes models, methods and algorithms focused on automatic accumulation and formation of knowledge based on data analysis and generalization. Includes learning by example (or inductive) as well as traditional approaches from the theory of pattern recognition.	5			v							

10	Optimal control of automation objects	The discipline studies the main features and features of automation production facilities. Requirements for the optimal control system, requirements for the optimal control method; formulation of the optimal control problem, formalization of the extreme problem, algorithms based on solving auxiliary problems, iterative algorithms, linear programming, optimal control of multistage processes, classical variational methods of optimal control, application of the maximum principle to solve the optimal control problem.	5									v	
11	MES systems	The course "MES-systems" deals with the collection and storage of data, the interaction of information subsystems in order to receive, accumulate and transmit technological and control data circulating in the production environment of the enterprise; product quality management, analysis of product quality measurement data; production process control, production process monitoring, automatic adjustment or interactive support for operator decisions, maintenance and repair management.	5	v		v							
Cycle of major disciplines University component													
12	Automation of technical systems	The content of the discipline includes the methodological foundations for creating an automated system for technological preparation of production (APS). Taking into account the trends in the development of modern industrial production and new information technologies for its automation, the main principles for building the architecture of an IT system are formulated.	5						v		v		
13	Research practice	Research practice (IP) is a form of professional training of undergraduates for scientific and pedagogical activities, which is a type of practical activity of undergraduates related to conducting scientific research within the framework of the chosen topic of the dissertation work, preparing scientific publications, final scientific qualification work (dissertation) and her subsequent defense. Research practice is a component of the main professional educational programs of the master's program. The purpose of the research practice is to develop the skills and abilities of undergraduates to conduct scientific research in the chosen direction, to use scientific methods in conducting research, to analyze, generalize and use the results obtained. The content of the research practice is determined by the work program of the practice, taking into account the specifics of the direction of training, determined by the department to which the undergraduate is attached, as well as the place and conditions for conducting the research practice.	4	v									

14	Complex control systems	Prerequisites: Automation of technical systems. Digital control systems. The purpose of the discipline - mastering the knowledge of modern technologies of automation and control of real multidimensional and multi-connected complex systems with several regulated circuits, as well as acquiring skills in the formation of automation strategy, the use of modern automation devices to solve problems of control of complex systems, solve the problems of modeling, analysis and synthesis of complex control systems. The purpose of teaching the discipline - the study of modern methods and principles of control of complex, multidimensional and multi-connected, systems.	4	v			v						
Cycle of major disciplines Selectable Component													
15	Diagnostics of system automation	The content of the discipline includes the characteristics of qualitative and quantitative indicators of the reliability of technical systems, their probabilistic and statistical evaluation based on test results, the analysis of the need and the choice of the redundancy rate, consideration of methods and models of technical diagnostics of automation systems.	5										v
16	The reliability of the management system and its elements	The discipline "Reliability of the control system and its elements" examines the basic terms, definitions and concepts in the theory of reliability, quantitative indicators of the reliability of renewable and non-renewable technical systems, the main methods for calculating the reliability of complex systems, types of tests for reliability, backup issues and determining the reliability of backup systems. To consolidate the theoretical materials, standard tasks are presented. As well as issues of reliability of automation and control systems.	5										v
17	Automation systems design	The discipline studied the stages of designing process control systems. Methods for preparing project documentation in accordance with modern international standards; methods for automating the construction of mathematical models, analysis and synthesis systems using modern computer technologies and automation of scientific research; trends in the development of science and technology and their impact on automation; The essence of the system approach in the design of modern hardware and software computing.	5	v									v
18	Distributed control systems	The content of the discipline "Distributed control systems" deals with the choice of structure and composition of hardware and software for distributed control systems. A distributed control system (DCS, DCS - Distributed Control System) can be defined as a system consisting of many devices spaced apart in space, each of which is independent of the others, but interacts with them to perform a common task. The	5				v					v	

		maximum benefits of a distributed system are achieved when controllers work autonomously, and the exchange of information between them is minimized.											
19	Project management	The discipline studies the components of project management based on modern behavioral models of project-oriented business development management. The program is based on the international standards PMI PMBOK, IPMA ICB and the standards of the Republic of Kazakhstan in the field of project management. The features of organizational management of business development through the interaction of strategic, project and operational management are studied.	5	v									
20	New information technologies	The course "New Information Technologies" considers the fundamental problems and mathematical methods of systems theory, the characteristics of the stages of system analysis, the procedures for system analysis, the collection of data on the functioning of the system, the study of information flows, the construction of system models, the verification of the adequacy of models, the analysis of uncertainty and sensitivity, the study of resource opportunities, determination of the goals of system analysis, formation of criteria, generation of alternatives, implementation of choice and decision-making; Models of complex systems; Classification of types of modeling of complex systems, principles and approaches to the construction of mathematical models, stages of building a mathematical model, methods for qualitative assessment of systems, methods for quantitative assessment of systems, decision-making in conditions of conflict, risk, uncertainties,	5								v		
21	Modern executive devices of automation systems	The course content discusses general issues of the theory of automation actuators, outlines the principles of classification of actuators and their main characteristics, as well as issues related to actuators as an element of an automation system. The main purpose of the training is to teach the ability to correctly select installation devices in automation systems.	5								v		
22	Optimal control systems	The content of the discipline "Optimal control systems" includes the study of mathematical methods of optimal control based on the classical calculus of variations, the basics of the maximum principle and the method of dynamic programming. Models and methods of programmatic and stabilizing optimal control are considered. Methods for the synthesis of intelligent optimal control systems are considered separately. Training of highly qualified personnel who know the basics of research and construction of optimal control systems based on the methods of classical calculus of variations.	5									v	

23	Systems of Technical vision	The discipline "Systems of Technical vision" deals with the main types of vision systems used in real-time control systems, features of vision hardware and software, ways of organizing and conducting experimental research in the field of vision systems. Methods of processing and transformation of inventions are studied.	5									v	
24	Digital control systems	The content of the discipline "Digital Control Systems" includes the study of the mathematical apparatus for describing digital systems, describing digital systems in the time and frequency domains, and synthesizing digital controllers in the automation of production processes. Obtaining knowledge about the principles of construction and features of the use of digital control systems, the conditions for the feasibility and performance of digital control systems and their application in the automation of technological processes in industry.	5			v				v			
25	Dynamics of Robot Control	The content of the discipline “Dynamics of robots control” includes the study of mathematical approaches for cyclic, positional and contour control of industrial robots, models and algorithms for kinematic and dynamic analysis of industrial robots, studies of the kinematics and dynamics of the manipulator and drive system of an industrial robot.	5					v					
26	Automation of control system design	The content of the discipline "Automation of control systemы design" includes the study of methods of analysis and synthesis of control systems, the choice of structure and the calculation of parameters of the control law. The procedures of analytical design of regulators, development of structural, functional and other automation schemes with the use of modern application software packages are considered.	5	v									
27	Automated projection of robotic systems	The course "Automated design of robotic systems" considers the training of specialists who own the theoretical foundations of designing control systems and methods for performing experimental and computational work on the creation and operation of automation systems based on modern software and hardware.	5	v									
28	Robotic technological complexes in discrete productions	The content of the discipline "Robotic technological complexes in discrete industries" includes the study of mathematical methods of program control of robots, the basics of developing algorithms and robot control cyclograms. The structure, composition of cyclic, positional and contour systems of program control of robots, systems of digital program control of machine tools and machines are considered. Methods for developing algorithms and cyclograms for controlling robots as part of a robotic system, developing cyclic, positional and contour systems for program control of robots.	5								v		
29	Modern local automation and control systems	The content of the discipline includes the study of modern approaches to the analysis and synthesis of automatic control systems based on the	5				v						

		state space methodology. The properties of linear and nonlinear systems and methods for their study are considered from a unified standpoint of the state space method. Provides basic information about systems with variable structure, modal control, identification, adaptation and optimization in control systems.												
30	Machine learning algorithms in process automation	COURSE AIM AND OBJECTIVES The purpose of the discipline is to study methods of machine learning and analysis of big data for making management decisions in automated control systems of technological processes. The course focuses on determining the key variables of technological processes, identifying their interdependence and their impact on qualitative and quantitative indicators of production. Processing and analysis of large amounts of technological data. Particular attention is paid to machine learning algorithms that allow you to establish complex technological relationships without building complex mathematical models in conditions of uncertainty.	5			v								
31	Machine learning algorithms in equipment condition diagnostic systems	The purpose of the discipline is to analyze technological equipment in terms of diagnosing its condition and studying methods of machine learning and big data analysis to solve problems related to the identification of the technical condition of equipment. The course deals with the development of modern systems of equipment condition identification and strategies for maintenance and repair of equipment - according to the actual state. These systems are based on machine learning (ML) algorithms. Within the framework of the course the possibility of application of modern ML algorithms for equipment diagnostics, such as Decision Tree, Random Forest and others is considered. Python programming language is used to implement these algorithms.	5											v

5. Curriculum of the educational program

KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY named after K.I.SATBAYEV

SATBAYEV UNIVERSITY

APPROVED
Chairman of the Management Board-
Rector of KazNRTU named after K.Satpayev
_____ M.M. Begentaev
"01" 07 2023 y.

CURRICULUM
of Educational Program on enrollment for 2023-2024 academic year

Educational program 7M07101 - "Automation and robotization"
Group of educational programs M100 - "Automation and control"

Form of study: full-time | Duration of study: 2 year | Academic degree: Master of Technical Sciences

Discipline code	Name of disciplines	Cycle	Total amount in credits	Total hours	Classroom amount lec/lab/pr	SIS (including TSIS) in hours	Form of control	Allocation of face-to-face training based on courses and semesters			
								1 course		2 course	
								1 semester	2 semester	3 semester	4 semester
CYCLE OF BASIC DISCIPLINES (BD)											
M-1. Module of basic training (university component)											
LNG210	Foreign language (professional)	BD UC	5	150	0/0/3	105	E	5			
HUM214	Management Psychology	BD UC	3	90	1/0/1	60	E		3		
HUM212	History and philosophy of science	BD UC	3	90	1/0/1	60	E		3		
HUM213	Higher school pedagogy	BD UC	3	90	1/0/1	60	E	3			
M-2. Module of theoretical foundations of management (optional component)											
AUT703	Modern control theory	BD CCH	5	150	2/0/1	105	E	5			
AUT297	Integrated automation technology and management				2/0/1						
AUT266	Data Mining Methods	BD CCH	5	150	2/0/1	105	E	5			
AUT267	Intelligent technology in robotics				2/0/1						
AUT708	Automation of technical systems	PD UC	5	150	2/0/1	105	E	5			
AUT299	Diagnostics of system automation	PD CCH	5	150	2/0/1	105	E		5		
AUT700	The reliability of the management system and its elements				2/0/1						
AUT225	Automation systems design	PD CCH	5	150	2/0/1	105	E			5	
AUT707	Distributed Control Systems				2/0/1						
MNG705	Project Management				2/0/1						
M-3. Control system design module (optional component)											
AUT217	Optimal control automation objects	BD CCH	5	150	2/0/1	105	E		5		
AUT264	MES systems				2/0/1						
AUT709	New information technologies	PD CCH	5	150	2/0/1	105	E	5			
AUT285	Modern executive devices of automation systems				1/1/1	90					
AUT714	Machine learning algorithms in process automation	PD CCH	5	150	2/1/0	90	E		5		
AUT715	Machine learning algorithms in equipment condition diagnostic systems				2/1/0						
AUT705	Optimal control systems	PD CCH	5	150	2/0/1	105	E			5	
AUT706	Technical Vision system				2/0/1						
AUT227	Digital control systems	PD CCH	5	150	2/0/1	105	E			5	
AUT251	Dynamics of robot control				1/1/1	90					
AUT701	Automation of control systems design	PD CCH	5	150	2/0/1	105	E			5	
AUT702	Automated projection of robotic systems				2/0/1						
AUT228	Robotic technological complexes in discrete productions	PD CCH	5	150	2/0/1	105	E			5	
AUT231	Modern local automation and control systems				1/1/1	90					
AUT713	Complex control systems	PD UC	4	120	1/0/1	90	E				4
M-4. Practice-oriented module											
AAP229	Pedagogical practice	BD UC	6						6		
AAP256	Research practice	PD UC	4								4
M-5. Experimental research module											
AAP251	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	2					2			
AAP241	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	3						3		
AAP254	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	5							5	

AAP255	Research work of a master's student, including internship and completion of a master's thesis	RWMS UC	14									14
M-6. Module of final attestation												
ECA212	Preparation and defense of a master's thesis	FA	8									8
Total based on UNIVERSITY:								30	30	30	30	
								60		60		

Number of credits for the entire period of study					
Cycle code	Cycles of disciplines	Credits			
			university component (UC)	component of choice (CCH)	Total
BD	Cycle of basic disciplines		20	15	35
PD	Cycle of profile disciplines		13	40	53
	Total for theoretical training:	*8*	*33*	*55*	*88*
	RWMS	*24*			*24*
FA	Final attestation	8			8
	TOTAL:	32	33	55	120

Decision of the Academic Council of Kazeta named after K.Satpayev. Protocol № 3 27.10.2022 y.

Decision of the Educational and Methodological Council of Kazeta named after K.Satpayev. Protocol № 2 21.10.2022 y.

Decision of the Academic Council of the Institute AaIT. Protocol № 2 от "20" 09 2022 y.

Vice-Rector for Academic Affairs — B.A. Zhautikov

Institute Director of AaIT — R.K. Uskenbayeva

Department Head of AaC — N.U. Akhiyarov

Representative of the Council from employers — S.K. Abdigaliyev

6. Additional educational programs (Minor)

Name of additional educational programs (Minor) with disciplines	Total number of credits	Recommended semesters of study	Documents on the results of development additional educational programs (Minor)