Non-commercial joint-stock company
«Kazakh National Agrarian Research University»

AGREED
Deputy General Director of the
RSE "Institute of Information and
Computing Technologies" KN
MNE RK, PhD, assoc. Professor"
_____ Mamyrbaev O.
"01" 03 2024 y.

APPROVED
Chairman of the Board – Rector
_____ Kurishbaev A.
«01» 03 2024 y.

AGREED
Director of the RSE branch on PVC
"Information Center of the Bureau of National
Statistics of the Agency for Strategic Planning and
Reforms of the Republic of Kazakhstan" in Almaty
_____ Iemberdiev E.
03 2024 y.

EDUCATIONAL PROGRAM

«7M06106 - Information Systems»

Awarded degree: Master of Engineering and Technology under the educational programme
«7M06106 - Information Systems»

(profile direction 1 year)

Approved at the meeting of the Department «Energy saving and automation»
Protocol №____ «__» _____ 2024 y.
Head of the department _____ E. Amanbaeva

Considered at meetings Academic committee of the Faculty of «Engineering - technical»
Protocol № ___ « _» _____2024 y.
Chairman of the AC of the faculty _____ U. Ibishev

Reviewed by the Educational Methodological Council of the University and recommended to the Academic Council
Protocol № ___ « _» _____2024 y.

Chairman of the EMS of the University _____ A. Abdyrov

The educational program was approved at the meeting of the Academic Council of KazNARU
Protocol №___, «___» _____ 2024 y.

Developers:

Dean of the Faculty — L. Aldibaeva
Head of department — E. Amanbaeva
Teacher — G. Kurmankulova
Master's student of MIS 23-4P group — Shahab Nadri

Graduate - 2023 — A. Zhaksylykova

Employers:

Deputy General Director of the RSE "Institute of Information and Computing Technologies" KN MNE RK, PhD, assoc. Professor" — O. Mamyrbaev

Director of the RMC branch "Information and computing center of the National Statistics Bureau of the Republic of Kazakhstan" in Almaty — E. Iemberdiev

Agreed:

Head of the Educational Program Design Office — Zh. Kussainova

Application

It is intended for the implementation of training of masters in a modular educational program **«7M06106 Information Systems»** in NON-COMMERCIAL JOINT-STOCK COMPANY «Kazakh national agrarian university»

Normative documents

Law of the Republic of Kazakhstan On Education Astana, Akorda, July 27, 2007 No. 319-III ZRK (with changes and additions as of 01/01/2019)

State obligatory standard of higher and postgraduate education. Approved by the Resolution of the Government of the Republic of Kazakhstan dated October 30, 2018 No. 604

Classifier of areas of training with higher and postgraduate education No. 569 13.10.2018;

Model Rules for the Activities of Educational Organizations Implementing Educational Programs of Higher and (or) Postgraduate Education, MES RK of October 30, 2018 No. 595.

Rules of the educational process on credit technology training. Order of the Ministry of Education and Science of the Republic of Kazakhstan № 563 dated October 12, 2018.

Industry qualifications framework: ORC Information and communication technologies, Approved by Protocol No. 1 of the meeting of the industry Commission on social partnership and regulation of social and labor relations in the field of information and communication technologies of 20. 12.2016.

Professional standards for the Educational Program and activities on production and technological (№ 20/46 from 20.01. 2014 y) and organizational and managerial activities (№ 20/47 from 20.01.2014 year)

Professional standard of the National chamber of Entrepreneurs of Kazakhstan "Atameken»:

1. «"System analysis in information and communication technologies

technologies", Annex No. 2 to the order of the Deputy Chairman of the Board of the National chamber of entrepreneurs of the Republic of Kazakhstan "Atameken" No. 171 dated July 17, 2017

2. "Business analysis in information and communication technologies", Annex № 3 to the order of the Deputy Chairman of the National chamber of entrepreneurs of the Republic of Kazakhstan "Atameken" № 171 dated July 17, 2017

Professional standards of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken". Appendix No. 5 to the order of the Deputy Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken" dated December 5, 2022 No. 222

1. Business analytics and IT project management
2. Development of graphic and multimedia design
3. Development of artificial intelligence applications
4. Development of big data processing and storage systems
5. Administration and maintenance of the Web

1. Паспорт модульной образовательной программы «Ақпараттық жүйелер»

Code and classification of the field of education	7M06 - Information and communication technologies
Code and classification of training areas	7M061 - Information and communication technologies
The code and name of the educational program	«7M06102 -Information systems»
Type of educational program	Effective
Educational program goal	The purpose of the educational program is to prepare information systems specialists competitive in the labor market for state, local, regional, foreign institutions with technical skills in designing, operating, modeling and managing information processes
ISCED level	7
NQF level	7
ORC level	7

Training license application number	KZ42LAA00006720 27 марта 2019 года
Accreditation OP	Specialized Accreditation Certificate SA №0096/1 НКАОКО 12.12.2016 -10.12.2021 г.
Name of accreditation body	Master of Science / Master in Information and Communication Technologies in the educational program "7M06102 Information Systems"
Learning outcomes	table 2
List of qualifications and positions	The graduate can perform design, production, technological, experimental research, organizational and managerial, operational types of professional activities in the departments: - state bodies (ministries, akimats, as well as their regional structures and units); - national and private domestic, foreign companies, factories and factories; - computer companies whose activities are based on IT technology. Including: - computer technology engineer; - digital information processing engineer; - information systems development engineer4 - Researcher (in the field of ICT), - Systems Analyst. Specialist: - on conducting business analysis in ICT; - ICT project manager; - software engineer, administrator of computer systems. - software product support; - Web page developer; - Specialist in the development and layout of the graphical interface. Engineer: - on maintenance of databases; IT Infrastructure Architect - information technology infrastructure; - Information Security Engineer. Specialist: - on cloud computing; - on the development of technical documentation; - on the creation and management of information resources (content manager); - contract specialist Head: - projects in the field of information technology and in information support units; - cadastral information systems; - units for the protection of information resources. Chief: - computer center and information protection department; - Computing (information and computing) center and others.
Area of professional activity	state bodies (ministries, akimats, as well as their regional structures and units);

	- national and private domestic, foreign companies, factories and factories; - educational and scientific centers; - culture and health care, agriculture; - computer companies whose activities are based on IT technology.
The scope and object of professional activity	are public and private companies or their departments using: - computers, complexes, systems and networks; - information systems for processing and managing information; - computer-aided design systems; - information support of information systems (programs, software systems and database systems).
Professional Functions	The educational program "7M06102 -" Information Systems "includes 2 (two) educational trajectories: No. 1. OT "Information systems in engineering" The professional activity of the master is aimed at: - creation of components of information systems, - production of programs and software systems; - testing and debugging of software systems of information systems; - installation, configuration and administration of network services of computer networks; - certification of objects of professional activity; - project management of the creation, implementation and maintenance of information systems; - the choice of technology, tools in organizing the process of development and implementation of objects of professional activity; - development of requirements and specifications of individual components of objects of professional activity on the basis of analysis of user requests, domain models and technical capabilities; - designing the architecture of components of information systems; - Designing a human-machine interface for hardware and software systems; No. 2. OT "Information systems in business" The professional activity of the master is aimed at: - designing of mathematical, linguistic, informational, software and technical support of information systems based on modern methods, design tools and technologies, including using computer-aided design systems. Including - preparation of the IP development process - analysis of IP requirements - IP design - programming and testing of IP - integration of software modules and IP components - organization of the individual stages of the process of developing objects of professional activity with a given quality at a given time; - - staff training in the framework of the adopted organization of the process of developing objects of professional activity;
Types of professional activity	**Masters of training 7M061 - "Information and Communication Technologies" can perform the following types of professional activities**: 1. **Evaluation:**

	- based on a clear presentation of the main content of the functions of IT technology, as a global technical phenomenon, be able to objectively assess their positive and negative capabilities; - be able to objectively assess the current state of IT technology, including technical, information and other types of support, as well as sound forecasting of IT development in Kazakhstan and abroad; - have the skills to identify and evaluate promising areas of development of information systems; - assessment of the performance of IP. - evaluation of software code for compliance with the required quality criteria 2. **Constructive:** - be able to develop and promote IT technology facilities aimed at promising areas of IP development, including having the skills to ensure security and information protection; - be able to develop and implement effective software products, educational and commercial orientation, able to meet the needs of users and provide a real structuring of databases, which runs the entire system of IT-technologies; - develop and implement assembly procedures for software modules and IP components; - develop procedures for the migration and transformation (conversion) of data; - design typical databases, develop and optimize complex SQL queries; - select and use appropriate ORM systems. - develop functionality for working with the database. 3. **Information technology**: - the ability to develop programs based on knowledge in the field of economic fundamentals and agribusiness; - have strong knowledge about the main areas of IT technology in Kazakhstan and in the world sector, compliance with all formalities and provided procedures in accordance with international standards; - have skills in managing IT technology facilities; - be able to conduct marketing research in order to increase the efficiency of enterprises and have the skills to apply in the professional activity of IT-technology; - The principles of designing database schemas, optimizing queries, storing and reading data from a DBMS (transactions, isolation levels, indexes, triggers); - approaches to the integration of software modules and components of IP; - operating principles and functionality of the OS; - methods and tools for assembling software modules and components of IP; - methods and means of verifying the performance of IP; - be able to use professional languages, utilities and programming environments 4. **Organizational and managerial:** - be able to actively use modern technical devices in practical activities; - have the skills to apply knowledge about the agro-economic, national and cultural characteristics of the country and to take them into account in their work;

	- development and implementation of technological regulations aimed at reducing the risk of accidents and accidents at the workplace; - selection and training of personnel for working with databases; - calculation of the number of staff; - personnel management and ensuring the protection and security of information. **5. Research:** - readiness for professional self-improvement, the development of innovative thinking and creative potential, professional excellence; - formulation and solution of problems arising in the course of scientific research and pedagogical activities and requiring in-depth professional knowledge; - monitoring of industrial and environmental parameters, analysis and processing of results; - conducting research work to develop methods and means to increase the productivity of production facilities; - research and development of measures to ensure information security; - organization of work to provide jobs with software and hardware. **6. Scientific and pedagogical:** - readiness to design and implement in educational practice the new content of curricula, implement innovative educational technologies; - the study of modern teaching methods of disciplines in ICT; - development of scientifically based methods for advanced training of personnel at all levels; - the use of innovative teaching technologies in the process of teaching.
Be competent	- in the field of research methodology; - in matters of innovative technical and technological production in all industries, including agriculture; - in the field of scientific and scientific-pedagogical activity in educational organizations; - in the implementation of scientific projects and research in the professional field. - in the improvement and development of their intellectual and cultural level, to independently learn new research methods in ICT and the scientific and technological development of information and communication technologies; - in knowledge management in the context of the formation and development of the information society: analyze, synthesize and critically summarize and present information; - in the study of modern problems and methods of applied informatics and scientific and technical development of information and communication technologies; - in establishing the laws of formation and development of the information society in a specific applied field; - in practical application of new scientific principles and research methods; - in the application and operation of modern computer equipment and software in accordance with the objectives of the OOP magistracy.

Learning outcomes in EP

Codes	Learning outcomes
LO1	Demonstrate skills and knowledge on the basics of psychology and pedagogy, use modern management methods, find the best options in various psychological situations and make management decisions
LO2	Apply at a professional level your knowledge, understanding and ability to conduct professional conversation in an international environment in English, in a broader interdisciplinary context of scientific, technical and pedagogical issues
LO3	Be proficient in modern pedagogical technologies. Demonstrate a willingness to lead and provide a healthy psychological climate, taking into account social, ethical and scientific considerations. Solve problems in the field of pedagogy and psychology that cause the emergence of conflict, help overcome difficulties
LO4	Master scientific phenomena as a subject of special philosophical analysis, know the laws of the development of science and the structure of scientific knowledge and use it in research methods.
LO5	Distinguish between information systems and their components, including computer graphics programs, database systems, and websites. Develop modern information systems, apply practical tools including visual and audio effects, multi-programming of various situations under the unified control of an interactive, machine learning process. Design Web sites and use graphic design, multimedia, visual communications, etc. Apply CMS systems to organize website management and the basic principles, methods and means of ensuring comprehensive site security. Website technical support
LO6	Conduct an examination of the performance of telecommunications and wireless systems at the design and operation stages, develop recommendations for increasing the level of security and intellectual protection.
LO7	Describe mathematical methods for solving engineering problems, use methods for solving linear, nonlinear programming problems, two-index problems, and multicriteria optimization problems. Select search methods for storing and processing data, create databases based on BigData tools. Develop and manage software tools for automating big data processing
LO8	Compare tasks in the applied area, use quantitative and qualitative assessment, carry out intellectual and business analysis, pose and solve applied problems. Know the principles of operation of virtual and augmented reality programs, the basics of VR development and the use of VR programs. Apply virtual reality VR, the principles of VR/AR, have skills in the formation and design of a virtual world, when creating the effect of being in another space.
LO9	Maintain leadership qualities in organizing and conducting scientific research, the ability to demonstrate business skills and argue the process of modeling business decisions, evaluate the effectiveness of business management. Develop algorithms for processing big data and use methods for quickly searching and processing data. Apply models and methods for solving data analysis problems in accordance with the designed professional modules.
LO10	Design and apply intelligent information systems, develop and test artificial intelligence algorithms with subsequent documentary support and operation. Development and software implementation of an artificial intelligence system. Experimental operation of artificial intelligence systems and its implementation. Plan research tasks and conduct scientific

	experiments, evaluate research results, analyze the cost-effectiveness of intellectual information systems, evaluate project costs and risks.
LO11	Develop effective scientific and engineering activities, design the architecture of wireless and neural networks, use pattern-based information system services, apply research results and subject them to critical analysis and verification. Design and development of interactive design for web applications
LO12	Describe models and methods, evaluate data used in the design process, in intellectual analysis, development and evolution of information systems. Apply methods and tools for checking the performance of artificial intelligence systems. Know the principles of VR/AR, creating various effects.
LO13	Design and manage data in a relational database, manage projects, data in Big Data and perform intelligent data processing. Analyzing huge amounts of information. Recognize graphic objects and include them in a database, use programming languages when developing Web pages. Application of interactive multimedia elements in web programming. Have practical skills in the field of computer vision, VR, apply the principles of virtual and mixed reality when developing IP.

The content of the modular educational program
«7M06106 Information Systems»
(profile direction 1.0y.)

пп	BK/ KB	Discipline code	The name of the discipline forming competencies	Total in academic loans	Volume in hours Distribution of loans by course and semester							Volume in hours Distribution of loans by course and semester				Department1	Form of control
					Total in academic hours	Classroom				Department 1 Form of control		Departm ent1 Form of control		2 course			
						Lectures	Practical classes	Laboratory classes	Other (practice)	SRMP	SRM	1	2	3	4		
1	**TT**		**Theoretical training**	**35**	**900**	**105**	**245**	**0**	**0**	**175**	**525**						
CBD: UK/OC			**University component / Optional component**	**10**	**300**	**0**	**150**	**0**	**0**	**0**	**150**	**8**	**2**				
1.1	**CBD**		**The cycle of basic disciplines:**														
		Module 1 Scientific Communication and Learning Organization															
1)	**UK**		**University component**	**6**	**180**	**18**	**90**	**0**	**0**		**90**	4	2				
			including:														
.1.1	**UK**	FL60202	Foreign language (professional)	**2**	**2**	60	0	30	0	0		30	2			14	Exam

.1.2	**UK**	Men/Man60203	Management	**2**	**2**	60	0	30	0	0		30	2			6	Exam
.1.3	**UK**	PM60204	Psychology of management	**2**	**2**	60	0	30	0	0		30				6	Exam
2)	**OC**	**Optional component**		**4**	**120**	**12**	**28**	**0**	**0**	**20**	**60**						
Module 2 Media Technologies, Teaching Methods, and Modeling																	
.1.4	**OC**	MT 60205/MLM 60207	Media technology*/ Machine learning methods**	**2**	60	0	30	0	0		30	2				9	Comprehensive Exam
1.6	**OC**	MMMEP 60206 /MMPC 60208	Mathematical methods and models in engineering problems*/ Mathematical modeling of governance processes**	**2**	60	0	30	0	0		30	2				9	Comprehensive Exam
SD: UC/OC		**The cycle of specialized disciplines:: University component / Optional component**															
.2	**CSD**	**The cycle of specialized disciplines**		**23**	**450**	**105**	**113**	**0**	**0**	**210**	**255**	**18**	**6**				
1)	**UC**	**University component**		**9**	**180**	**45**	**45**	**0**	**0**	**90**	**90**		9				
Module 3 Project Management and Research Methodology																	
2.1	**UC**	Con 60301/ BDM60303	Conflictology/ Business Decision Modeling	**3**	60	15	15	0	0	30	30		3			6	Exam
2.2	**UC**	MTRIS 60303	Methods of teaching and research in information systems	**3**	60	15	15	0	0	30	30		3			9	Exam
2.3	**UC**	PM60305	Project Management in Entrepreneurship	**3**	60	15	15	0	0	30	30		3			9	Exam
2)	**OC**	**Optional component**		**14**	**270**	**60**	**75**	**0**	**0**	**90**	**165**	6	6				
Module 4 Computer Intelligence and Application Design																	

2.6	**OC**	CI70306 /IBDA 70310	Computer intelligence*/ Intellectual and business data analysis**	**3**	60	15	15	0	0	30	30	3				9	Com pre hen sive Exa m
2.7	**OC**	WBAD 70307/ WT 70311	Web-based application development*/ Wireless technologies**	**3**	60	15	15	0	0	30	30	3				9	
			Module 5 Mining and Architecture															
2.8	**OC**	AMDIS 70308/ ISA703 12	Analysis modeling and design of IS*/ Information Systems Architecture**	**5**	90	15	30	0	0	30	75		5			9	Com pre hen sive Exa m
2.9	**OC**	SQL 70313	Structured Query Language (SQL)	**3**	60	15	15	0	0	30	30		3			9	
			TOTAL №1 ББТ/ ОТ:	**13**	**390**	**39**	**91**	**0**	**0**	**65**	**195**						
3)	**UC**	ISh 60300	**Internship**	**6**	**180**								6			9	repor t
2	**UC**	**ERWG M** 603001	Experimental research work of the master (EIRM), including the internship and the implementation of the master's project	13	540							5	8				repor t
3		**ATT**	**Additional types of training**														
.1	UC	**FE 603002**	**final examination**	8	240								8				
)			Registration and protection of the master's project (OiZMP)										8				OiZ MP
			TOTAL EP:	**60**	**1560**	**105**	**270**	**0**	**0**	**210**	**405**	**30**	**30**	**0**	**0**	**0**	

Educational trajectory No. 1 "Information systems in engineering" *
Educational trajectory No. 2 "Information systems in business" **

Core competencies	Profile direction 1			
Disciplines	Learning outcomes			
Module 1 Scientific communication, management and organization of the learning process				
History and philosophy of science				
Foreign language (professional)	PO2	PO5		
Higher education pedagogy				
Management	**PO3**	PO5		
Psychology of management	PO1	PO3	PO4	PO5
/ Teaching practice				
Component of choice				
Module 2 Media Technologies, Methods and Models in Engineering Problems				
Media technologies	PO5	PO8	PO13	
Mathematical methods and models in engineering problems	PO7	PO8		
Machine learning methods	PO5	PO10	PO11	PO12
Mathematical modeling of control processes	PO7	PO8	PO12	
Professional competence				
Module 3 Project Management and Research Methodology				
Conflictology	PO3	PO9		
Scientific research methodology in information systems	PO1	PO4	PO5	PO10
Business decision modeling	PO4	PO7	PO8	
Project Management in Entrepreneurship	PO4	PO5	PO8	PO11
Component of choice				
Module 4 Application Design and Intelligent Systems				
Computer intelligence	**PO6**	**PO8**	**PO12**	**PO13**
Web-based application development	**PO8**	**PO11**	**PO13**	
Analysis, modeling and design of IS	**PO7**	**PO10**	**PO11**	**PO12**
Module 5 Intelligence and Wireless Technologies				
Data mining and business analysis	**PO8**	**PO12**	**PO13**	
Wireless technology	**PO6**	**PO10**	**PO11**	
Information systems architecture	**PO6**	**PO10**	**PO11**	
Structured Query Language (SQL)	**PO7**	**PO13**		
Research practice				
Internship	**PO3**	**PO5**		
/ NIRM	**PO4**	PO5		
EIRM				
IA				
TOTAL:	**0**	**0**	**300**	**900**

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Information about disciplines
For profile direction

		Content			Learning outcome	Competency
1.1.1	Foreign language (professional)	The main goal of the discipline is the systematic deepening of communicative competence in the framework of international standards of foreign language education based on the further development of the skills and abilities of active proficiency in English in the professional activities of the future master of sciences. Development of a master student skills: - reading literature in English in the specialty for the receipt and transmission of scientific information; - registration of the extracted information in the form of translations, annotations, abstracts; - conducting conversations in English on topics related to the specialty and scientific work of the master's program student.	2	1	Defines communicative skills, communicative competence of foreign language skills, its components and tasks, speaking skills, development of communication skills of the main types of speech activity and language competence, learning new language tools, phonetic, spelling, lexical, grammatical and socio-cultural competencies	Ability to conduct a conversation in a professional international environment in english
1.1.3.1	Management	Aimed at the formation of a broad scientific management view, outlook, professional competencies in order to understand the processes and phenomena in organizations operating in a competitive environment, taking into account the dynamics of management development in the context of its schools, concepts and approaches, development trends	2	1	Learning outcome Be able to carry out management activites, solue economic fnd social issues, analyze the experience of foreign countries and use it in Kazakhstan	***To be competent:*** - An ability to think creatively, analyses the environment and be ready to make management decisions, command influence from leadership positions to achieve the goals of the organization.

1.1.4	Psychology of management	Discipline examines the subject, nature, tasks and structure of management psychology, methods of psychological research and basic approaches to its study. Examines the psychology of the subject of management, the psychology of cognitive activity, perceptual, mnemic, thought processes in management. The course forms ideas about etiquette in the activity of a modern business person, communicative competence of a manager, emotional and volitional states in management activities and ability to manage activities.	2	2	To master the psychology of pedagogical communication, form students' cognitive activity, identify psychological methods and means of improving the effectiveness of training, use psychological foundations and adaptation of psycho-diagnostic personality problems, psychological counseling and master the psychology of pedagogical communication.	The ability to demonstrate horizons in the questions of the philosophy of science and psychology
1.1.5	Teaching practice		2	1		
1.1.6	Media technologies	Media technologies are a way of preparing electronic documents, including visual and audio effects, multiprogramming of various situations under the unified management of an interactive learning process, ways of communication. "Media" is an extensive concept that includes the entire set of media and techniques used to transmit a message to a particular consumer in one form or another.	2	1	Integration of visual and sound effects, unified management of an interactive educational process of preparing electronic documents, extensive use of all communication technologies, media equipment	Have competencies: - in work with the terminology of information technology and skills of speaking in front of an audience, participating in a discussion; - skills of comparative analysis and synthesis; - skills of working with multimedia materials, technologies and trends in the development of society.
1.1.7	Mathematical methods and models in engineering problems	The study of this discipline is devoted to the study of mathematical methods for solving engineering problems, algorithms for finding engineering solutions, methods for solving problems of linear, nonlinear programming, two-index problems, problems of multi-	2	1	Apply mathematical methods for solving engineering problems, algorithms for finding engineering solutions, methods for solving linear, non-linear programming problems, optimizing using two-index	Be competent: is able to study the new method of research in case of change of directions of scientific and scientific-industrial activity in his professional activity; select

		criteria optimization, processing experimental data, numerical solving differential equations.			problems, multi-criteria optimization problems, processing experimental data, numerical solving differential equations.	the methods and prepare an algorithm for designing and managing the automated object; Supporting information and computer business based on the use of global Internet.
1.1.8	Machine learning methods	The study of the course "Methods of machine learning" is associated with the study of methods of artificial intelligence, a characteristic feature of which is not a direct solution of the problem, but learning in the process of applying solutions to many similar tasks. The purpose of the course is to build methods used by means of mathematical statistics, numerical methods, optimization methods, probability theory, graph theory, various techniques of working with data in digital form.	2	1	In the application of various methods of machine learning, artificial intelligence, in the search for solutions to complex problems, in the application of tools of mathematical statistics, numerical methods, optimization methods, probability theory, graphic theory and digital data processing.	-In the application of various methods of machine learning, artificial intelligence, in the search for solutions to complex problems; - in the application of tools of mathematical statistics, numerical methods, optimization methods, probability theory, graphic theory and digital data processing
1.1.9	Mathematical modeling of the process of control	General questions of the theory of modeling, methods of construction of mathematical models and the formal description of processes in controlled objects. The use of mathematical models for building automated process control systems and solving optimization problems for the structure and parameters of systems. Basic concepts of modeling and similarity theory, theoretical principles and methods of experimental research used to construct mathematical models	2	1	The choice of factors, components and variables when creating mathematical models of management processes, using its basic concepts and terms, system components, independent, dependent variables, controlled, non-controlled variables, endogenous, exogenous variables; familiarization with the results of the model completeness assessment	-in the choice of factors, components and variables in the development of mathematical models of management processes; -in the use of basic concepts and terms, system components, independent, dependent variables; - in the process of selecting the parameters of controlled, uncontrolled, endogenous, exogenous and in the analysis of the results of the assessment of the completeness of the model.

1.2.1	Conflictology	It investigates the causes of death, maladaptation, development, solving and ending conflict conflicts. The problem that is identified by the problem of conflict in the conflict can only be sustained by the difficulties that have already become apparent in the definition of conflict of interest, conflict, and conflict.	3	2	Owns the laws of the birth, occurrence, development, resolution and completion of conflicts of any level. The solution of a certain range of problems that caused the emergence of a conflict, contributing to overcoming the difficulties that have already become apparent in connection with the definition of the nature of the conflict, the object and subject of the conflict.	Be competent: in the practical use of the obtained psychological and pedagogical knowledge in various conditions of activity and in teaching practice; in diagnosing and preventing conflicts.
1.2.3	Methods of teaching and research in information systems	The methodology of science is the doctrine of the methods and procedures of scientific activity, as well as a section of the general theory of knowledge (epistemology), especially the theory of scientific knowledge (epistemology) and the philosophy of science. The main task of the methodology of science is to provide a heuristic form of knowledge with a system of strictly verified and approved principles, methods, rules and norms.	3	2	The ability to create on the basis of scientific research normal and safe conditions for human activity, master the methods and procedures of scientific activity, as well as the general theory of education (gneozologiya), the theory of scientific knowledge (epistemology) and the philosophy of science. To be able to apply strictly verified principles, methods, rules and norms of the system to achieve scientific results.	- in understanding the interaction of science and technology, social and ethical problems, the essence of scientific rationality; - in organizing and conducting research, managing research projects, setting and solving research tasks in the field of IP and in monitoring, analyzing and evaluating the results of scientific research.
1.2.4	Business decision modeling	The concept of business process modeling is formed, knowledge related to economics, computer science, and modeling of complex systems. As a result of modeling, enterprise resources are used to process an object in order to achieve certain measurable results or create products to satisfy internal or external consumers. The purpose of	3	2	Make a model of business processes, gain knowledge related to the economy, computer science, modeling of complex systems. Use the business process as a logically complete chain of interrelated and repetitive activities in order to achieve certain measurable results or	***To be competent:*** - to understand the social importance of business activity, to make management decisions and to bear responsibility for them; - to use innovative technologies in business activity, search and process

		business process modeling is to describe the real progress of the company's business processes.			create products to meet the needs of consumers. The purpose of the simulation is to describe the real progress of the company's business processes.	information necessary for solving professional tasks; - plan and implement entrepreneurial ideas, based on professional and personal development.
1.2.5	Project Management in Entrepreneurship	The basic concepts are given, as subjects of business relations, an entrepreneur. Entrepreneurship is an initiative activity of citizens and legal entities, regardless of the form of ownership, aimed at obtaining net income by meeting the demand for goods, based on part of the property, is implemented on the basis of certain principles: freedom, recognition of various forms of ownership, maintaining competition.	3	1	Satisfaction of the demand for goods from business, the implementation of proactive actions, based on certain principles and support of competition.	- in the implementation of the action for obtaining high income by meeting the demand for goods; - in the implementation of management actions on the basis of certain principles freedom, recognition of various forms of ownership, maintenance of competition.
1.2.6	Computer intelligence	Artificial intelligence as the science and technology of creating intelligent machines, intelligent computer programs; the ability of intelligent systems to perform creative functions that are traditionally considered the prerogative of man. One of the specific definitions of intelligence, common to humans and "machines", is given: "Intelligence is the ability of a system to create objects in the course of self-learning"	3	1	Artificial Intellect as a science and technology of creating intelligent machines and intelligent computer programs; the ability of intelligent systems to perform creative functions, to know the definition of intelligence, the ability of the system to create objects during self-learning	***To be competent:*** solve problems and directions of artificial intelligence and its structural scheme. - artificial neural networks, perceptrons, immunocomputering and artificial immune systems, as well as evolutionary computing. -to know the capabilities and features of pattern recognition and decision-making systems, practical knowledge extraction methods, communication, textological knowledge extraction

						methods, and knowledge structuring methods.
1.2.7	Web-based application development	Designing effective Web sites, portals, databases and applications: requirements analysis, information structuring, style, navigation, testing, browser compatibility. Designing Web-pages on the basis of language building technologies Web-application development technologies. Languages, technologies, 3D applications.	3	1	Design effective Web sites, portals, databases and applications: requirements analysis, information structuring, style, navigation, testing, browser compatibility. Web design. Web application development technology, use languages, technologies, 3D applications.	- in ways and ways of developing Web-sites; -in the basic methods and principles of creating Web-pages; -in the development of measures to increase traffic to the created sites and their design;
1.2.8	Analysis modeling and design of IS	Studying the theoretical and practical principles of designing information systems, as well as mastering the skills of analyzing, modeling, organizing and managing the process of designing an information system using various methods and tools.	5	2	Possess the theoretical and practical basics of designing IP, as well as mastering the skills of analyzing, modeling, organizing and managing the process of designing an IP using various methods and tools.	***To be competent:*** able to independently conduct research using modern methods of mathematical modeling and analysis of the results of a scientific experiment
1.2.10	Intellectual and business data analysis	Considers issues related to Data mining, data mining, intelligent, in-depth data analysis. Introduces the concepts used to use database development methods that were previously unknown, nontrivial, useful and available to interpret the knowledge necessary for making decisions in various fields.	3	1	To possess data mining tools, with data mining, intellectual, in-depth, analyze data, use concepts to develop a database of previously unknown, non-trivial, useful and available for the interpretation of knowledge necessary for making decisions in various fields	- to use concepts to develop a database of previously unknown, non-trivial, useful and accessible knowledge for interpretation.
1..2.11	Wireless technology	диоволны, а также Wireless technologies - a subclass of information technology, are used to transfer information between two or more points at a distance, without requiring wired communication. Radio waves can be used to transmit	3	1	To master the techniques of designing wireless networks, to know the technology of transmitting information between two or more points at a distance, without requiring a wired connection. Features of	- in matters of the use of wireless networks technology and the methodology for analyzing and synthesizing complex systems, principles for constructing wireless systems based on the use of

		information, as well as infrared, optical or laser radiation. There are many wireless technologies most commonly known by marketing names such as Wi-Fi, WiMAX, Bluetooth. Each technology has certain characteristics that are determined by its scope.			information transmission based on radio waves, infrared, optical or laser radiation.	modern computing devices and new information technologies; - in design methods using patterns and maintenance using pattern-based application design, in assessing the performance of applications.
1..2.12	Information Systems Architecture	Information Systems Architecture studies the structure and organization of information systems, covering the concepts, methods, and technologies needed to design and manage them. The main aspects considered within this discipline are; Information systems components include hardware, software, networks, and databases. Design principles and techniques, including data modeling, functional modeling, interface design, and integration of various components. Study of various architectural styles (e.g., client-server, layered systems, microservice architecture) and design patterns used to create reliable and scalable systems. Methods for organizing, storing and processing data, including databases, data warehouses and big data management techniques. Data	5	2	The architecture of information systems, the search for design decisions about the program structures, technical and information support, the interactions between these structures. Make design decisions that ensure the organization and selection of structural elements, the integration of system elements into subsystems; the choice of the architectural style that determines the logical and physical organization of the system, their interfaces and the ways of combining them.	- in the search for design solutions, in the development of the program structure, technical and information support. - in ensuring the organization and choice of structural elements, the integration of system elements into subsystems; - in the choice of the architectural style that determines the logical and physical organization of the system, their interface and methods of combining them.

		security and protection techniques, including encryption, access control and protection against cyber threats. Technologies and methods for integrating various information systems and applications, such as API, ESB (Enterprise Service Bus) and business process management (BPM) systems. Principles and technologies associated with the use of cloud platforms for deploying and managing information systems. Systems life cycle management, which studies methods for managing the processes of development, implementation, operation and modernization of information systems.				
1.2.13	Structured Query Language (SQL)	Description of the SQL language - "Structured Query Language" - a declarative programming language used to create, modify and manage data in a relational database, managed by the corresponding database management system. SQL, as an information and logical language designed to describe, modify and retrieve data stored in relational databases.	3	2	The structure and capabilities of the SQL language - a declarative programming language used to create, modify and manage data in a relational database; have the skills to use the appropriate database management system SQL, be able to use information-logical language to describe, change and extract data.	- in the development of SQL database structure; - in the application of acquired knowledge in the performance of research works; - in the implementation of information retrieval, search, storage and processing of data; - in the creation, modification and management of data in a relational database;

Appendix 1/ 6B06102 - Information Systems

Bases of practice of the educational program "Information Systems"

Base practice

№	Name of companies, enterprises	Contacts phone, e-mail
1	2	3
1	nstitute of Information and Computing Technologies	Тел.: +7 (727)272-37-11 E-mail:info@ipic.kz
2	Kazakh Research Institute of Mechanization and Electrification of Agriculture	Тел.: +7 (727)247-96-04 +7(777)271-57-28 E-ail:**kazniimech@yandex.kz**
3	Information and Computing Center of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan "in Almaty	тел.: +7(727)331-27-15, +7(727)331-27-11, E-mail:s.saduov@statdata.kz
4	Department of Statistics of the Almaty region of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan	тел: **+7(727)271-54-98** E-mail:oblstat.almaty@mail.ru
5	ATF Bank JSC	тел: +7(727)258-30-00 E-mail: contactcenter@atfbank.kz
6	Aktobe branch of Eurasian Bank JSC	Тел:8(7132)942903 E-mail:roma_1988_88@mail.ru
7	GU "Apparatus of akim of Alakol district	тел: 8(728)332-31-50 E-mail: alakolakimat@mail.ru
8	Post office Iliy district of Almaty region of JSC "Kazpost"	Тел: +7 (72752) 2–28–03 +7 (72752) 2–07–94
9	Zharkent Starch Factory	Тел: 8(728)9-24-86 E-mail: zhkpz1@mail.ru
10	Police Department of Kazygurt District, Police Department of Turkestan Region, MIA RK	Тел: 7(725)39-2-12-46 E-mail: mps.kazgurt@mvd.gov.kz
11	Almaty Kalasy, InfoSoftProm (1C Kazakhstan ZHS)	Тел.: +7(727)295-93-93, +7(707) 260-36-38 E-mail:hast@1c.kz
12	JSC "Almatytyranstelekom"	Тел: +7(728)40 61-0-00 +7(7272) 96-44-44 E-mail: support@ttc.kz
14	SEC "Nurly Asu"	Тел.: +7(727)757-64-88, E-mail:kanash_65@mail.ru
15	LLP "Media-net.kz"	Тел:. +7 (727)275-12-19, E-mail: marsalexandrovich@gmail.com
16	Azimut Solutions, IT & Telecomunications LLP	Тел.: 7(7257)3440964 E-mail:office@asolution.kz
17	LLP "Articul"	Тел.: 7(707) 83-88401, +7 (727) 385-13-37 E-mail.: info@articul.kz
18	Almaty Kalasy, "Asna Kazakhstan" ZHS	Тел:+7(701)733-97-90 E-mail:info@asna.kz
19	Nur-Asyl TransGroup LLP	Тел: +7(727)388-87-75 E-mail: nur_asyl_customs@mail.ru
20	Technobel LLP /	Тел.: +7(727)267-25-72 E-mail: info@jenty-spedition.com

[1]Note:

Department number	The name of the department
1	Agronomy, breeding and biotechnology
2	Fruit and vegetable growing, plant protection and quarantine
3	Soil science, agrochemistry and ecology
4	Obstetrics, surgery and reproduction biotechnology
5	Biological safety
6	Clinical Veterinary medicine
7	Microbiology, Virology and Immunology
8	Veterinary sanitary examination and hygiene
9	"Physiology, morphology and biochemistry" named after N.U.Bazanova
10	Forest resources, hunting and fisheries
11	Land resources and cadastre
12	Water resources and land reclamation
13	Accounting, audit and finance
14	«Management and organization of agribusiness» named after Kh.D. Churin
15	Law
16	Zooengineering
17	Technology and food safety
18	Agricultural machinery and mechanical engineering
19	"Machine use" named after I.V.Sakharov
20	Energy saving and automation
21	IT technologies and automation
22	Social disciplines
23	Kazakh and Russian languages
24	Foreign languages
25	Physical education and sports
26	Military Department

5. Сводная таблица, отражающая объем освоенных кредитов в разрезе образовательной программы:

Курс обучения	Семестр	Количество изучаемых дисциплин			Количество академических кредитах						Всего в академических	военная подготовка	Количество	
		ОК	ВК	КВ	Теоретическое обучение	Педагогическая практика	Производственная практика	НИРМ	Итоговая аттестация	Всего			Экзамен	Диф. зачет
I	1		6	9	15					13	810		6	
	2		23	20	43					27	90		4	1
II	3									30	810		5	2
	4						6	18	8	32	1140		1	
Итого		23	23			29	6	58	8	2	18		90	2700

Рецензия

на образовательную программу
«7М06106– Информационные системы»

Объем теоретической подготовки магистрантов по ОП 7М06106 – Информационные системы», реализуемый за 1 год, профильное направление позволяет обеспечить уровень, соответствующий требованиям обучения, за счет введения активных образовательных технологий, привлечения работодателей к учебному процессу.

Образовательная программа включает все необходимые разделы: содержание образовательной программы, перечень формируемых компетенций, рабочие учебные планы и графики прохождения учебного процесса, формуляры для описания модулей, сводную таблицу, отражающая объем освоенных кредитов в разрезе модулей образовательной программы и другие материалы.

ОП 7М06106 – Информационные системы» реализуемый за 1 год, имеет достаточное кадровое, учебно-методическое, информационное и материально-техническое обеспечение для подготовки высококвалифицированных специалистов в области Информационно-коммуникационных технологии.

В образовательной программе учтены компоненты, в соответствии с требованиями Государственного общеобязательного стандарта высшего и послевузовского образования. Утвержденного Правительством Республики Казахстан от 31 октября 2018 года № 604; Государственный общеобязательный стандартвысшего и послевузовского образования. Утвержден постановлением Правительства Республики Казахстан от 31 октября 2018 года № 604

Классификатор направлений подготовки кадров с высшим ипослевузовским образованием №569 13.10.2018 г; Типовые правила деятельности организаций образования, реализующих образовательные программы высшего и (или) послевузовского образования, МОН РК от 30 октября 2018 года № 595 и в соответствии с Законом Республики Казахстан «Об образовании», Положения о Министерстве науки и высшего образования Республики Казахстан, утвержденного постановлением Правительства Республики Казахстан от 19 августа 2022 года № 580; Правила организации учебного процесса по кредитной технологии обучения. Приказ МОН РК № 563 от 12 октября 2018 года.

Отраслевые рамки квалификаций: ОРК Информационно-коммуникационные технологии, Утверждена протоколом № 1 заседания отраслевой комиссии по социальному партнерству и регулированию социальных и трудовых отношений в сфере информационно-коммуникационных технологий от 20 декабря 2016 г.Приложение № 3 к приказу Заместителя Председателя Правления Национальной палаты

предпринимателей Республики Казахстан «Атамекен» № 171 от 17 июля 2017 года.

По образовательной программе «7М06106 – Информационные системы» магистранты изучают дисциплины, с учетом образовательных программ ведущих мировых вузов, составленных на основе международных программ ECAP, в том числе по образовательной программе университетов Малайзии и РФ.

Вновь введены дисциплины, как «Компьютерное зрение и анализ изображений», «Принципы представленной и смешанной реальности» и др.

В ОП имеются дисциплины обеспечивающие знания в области разработки алгоритмов искусственного интеллекта, нейронных сетей, Web-приложений и т.д.

Для подготовки специалистов нового уровня рекомендую ОП усилить компонентами Компьютерное зрение, VR, Принципы представленной и смешанной реальности, анализ изображений.

На основе анализа образовательной программы по подготовке магистрантов ОП «7М06106 – Информационные системы», можно отметить, что данная образовательная программа раскрывает широкие возможности для подготовки высококвалифицированных специалистов в области Информационно-коммуникационных технологии.

Заместитель генерального директора
РГП «Института информационных и
вычислительных технологий»
КН МНВО РК, PhD, ассоц. профессор» _____ Мамырбаев О.

«____» _____ 2024 г.