MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE REPUBLIC OF KAZAKHSTAN

KARAGANDA UNIVERSITY NAMED AFTER ACADEMICIAN EA.Buketov

«APPROVED»
Chairman of the management Board-Rector
Dulatbekov N.O.
«30 » 05 2023 y.

«AGREED»
Executive director of the Chamber of Entrepreneurs
Karaganda region "Atameken"
Kulpeisov E.D.
« B » 2023 y.

«AGREED»
Director of LLP «Samga Bilim Group»
Jaksylyk A.A.
« B » 202 y.

«AGREED»
Director of "Terricon Valley" LLP
Niyazov S.F.
« » 2023y.

EDUCATIONAL PROGRAM
in the direction of training "7M061 Information and communication technologies"

«7M06102 - IT entrepreneurship and digital economy»
Level: Master

Karaganda, 2023

The educational program in the field of training ""7M06102 - IT entrepreneurship and digital economy" was developed on the basis of:
- Law of the Republic of Kazakhstan dated July 27, 2007 No. 319-III "On Education" (with amendments and additions as of 03/27/2023),
- Order of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No. 2. Registered with the Ministry of Justice of the Republic of Kazakhstan on July 27, 2022 No. 28916. "On the approval of the state mandatory standards of higher and postgraduate education"
- On the approval of the Concept of Development of Higher Education and Science in the Republic of Kazakhstan for 2023-2029, approved by the Decree of the Government of the Republic of Kazakhstan dated March 28, 2023 No. 248.
- On approval of the Rules for the organization of the educational process on credit technology of education in organizations of higher and (or) postgraduate education Order of the Minister of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152. Registered with the Ministry of Justice of the Republic of Kazakhstan on May 27, 2011 No. 6976 (with amendments and additions dated 04/05/2023)
- The National Qualifications Framework of March 16, 2016 by the Republican Tripartite Commission on Social Partnership and Regulation of Social and Labor Relations.
- Classifier of training areas with higher and postgraduate education dated October 13, 2018 No. 569 (as amended by the Order of the Minister of Education and Science of the Republic of Kazakhstan dated 06/05/2020 No. 234)

Educational program in the specialty
«7M06102 - IT entrepreneurship and digital economy»

Content:

1. Passport of the educational program

1. Code and name of the educational program: «7M06102 - IT entrepreneurship and digital economy».
2. Code and classification of the field of education, areas of training: field of education - 7M06 Information and communication technologies; field of training 7M061 Information and communication technologies
3. Group of educational programs: M094 Information technology
4. Amount of credits: 120

5. Form of study: full-time
6. Language of instruction: Kazakh, Russian, English.
7. Degree: Master of Science in the educational program «7M06102 - IT entrepreneurship and digital economy».
8. Type of EP: current
9. ISCED level: 7
10. Level according to NFK: 7
11. Level according to SQF: 7
12. Distinguishing features of the EP
13. Number of the appendix to the license for the direction of personnel training: № KZ83LAA00018495 date of issue 28.07.2020, Appendix 016
14. Name of accreditation body and period of accreditation of EP:
15. Training of highly qualified specialists in the field of information technology, competitive in the labor market, who effectively perform professional functions for the development and maintenance of digital platforms and software for all types of economic activity at enterprises and organizations of any form of ownership, as well as educational institutions of all levels and research organizations.
16. Qualification characteristics of a graduate
a) A graduate of the Master's degree is awarded the degree of Master of Technical Sciences in the educational program «7M06102 - IT entrepreneurship and digital economy» and he can hold the following positions: CEO (Chief Executive Officer), CVO (Chief Visionary Of-fiction) of an IT company, firm, organization; CIO (Chief Information Officer) of an IT company, firms, organizations; CISO (Chief Information Security Officer) - Head of the IT Security Department, (Executive) Director of IT Security; economist-programmer in software development companies in high-tech industries, in research organizations, as well as at other enterprises that have a production need for interdisciplinary specialists; system and business analysts; system architects (business architects); sales managers of IT solutions and complex technical systems; information technology managers (project managers); information systems consultants; system administration specialists, database administrators, etc.; internet marketer (SEO specialist), etc.
b) The sphere of professional activity of graduates of the educational program «7M06102 - IT entrepreneurship and digital economy» is entrepreneurial activity in the IT sphere and various sectors of the digital economy, the activities of enterprises, organizations and institutions, international economic relations of state authorities.
The objects of professional activity of masters in the educational program «7M06102 - IT entrepreneurship and digital economy» are - IT companies, IT infrastructure facilities of enterprises of all forms of ownership, innovative companies, design organizations, research institutions, public administration and local self-government, consulting companies, banks, investment companies, venture capital companies, etc.
c) Types of professional activity of the graduate:
- Organizational and technological activities. The master in this field has the skills for qualified work in the field of development, implementation and application of methods of state regulation of the digital economy, analysis of the economic activity of an enterprise (firm, organization), including in the IT field, knowledge of decision-making methods and analysis of the results of management decisions to improve competitiveness and efficiency Kazakhstan's IT enterprises, systematizes and summarizes information for carrying out economic calculations on the activities of economic entities based on standard methods, taking into account the current regulatory framework; analyzes, evaluates, interprets the results obtained and substantiates conclusions through programming languages; takes an active part in the process of organizing, automating and robotizing production, providing resources for the production process, organizing marketing management, logistics, in the development of measures for rational use of natural resources and environmental protection.

- Production and management activities. A master in this field has the skills to analyze the current system and present options for updating, including cost-benefit analysis, analysis and formalization of user requirements; development of detailed system specifications; thorough software development for solving tasks and testing software solutions, user training, creation of training materials, user training and presentation of software solutions for users; installation, implementation and support of the system software.
- Project activity. The project activity of masters in this specialty is carried out in two main directions: organizational design and feasibility study of projects. Organizational design includes the development of organizational management structures, justification of the expected technical and economic results of their implementation and adaptation. The feasibility study of projects involves the preparation and implementation of design calculations, the development of special documentation (feasibility study, business plan, etc.) in relation to the organization of a new IT enterprise, technical re-equipment, reconstruction and expansion of the existing IT enterprise, the introduction of new types of IT products, as well as the implementation of compliance control of the developed IT projects to standards and other regulatory documents
- Research activities. The research activities of masters in this field of training are carried out both within the research programs of higher educational institutions and as part of the relevant research groups of research institutes, enterprises and organizations. A special place is given to international programs of scientific cooperation in the field of economics, entrepreneurship and the IT industry.
- Educational (pedagogical) activity. Educational (pedagogical) activity of graduates of this profile consists of professional activity (teaching economic disciplines) in general educational institutions, educational institutions of primary and secondary vocational education.
d) The specialist must be prepared to solve the following tasks of professional activity:
- Collect, analyze and calculate the initial data necessary for calculating economic and socio-economic indicators characterizing the activities of IT firms;
- Choose tools for processing economic data in accordance with the task, analyze the results of calculations and justify the conclusions;
- Build standard theoretical and econometric models, analyze and interpret the results in a meaningful way;
- Analyze and interpret financial, accounting and marketing information contained in the reports of IT firms, IT organizations and government agencies in order to use the information obtained to make management decisions on digitalization;
- Analyze and interpret the data of Kazakh and foreign statistics on socio-economic processes and phenomena and identify trends in socio-economic indicators;
- To use modern technical and technological means, information technologies for solving analytical, research and communication tasks;
- Organize the activities of the team created for the implementation of a specific economic and IT project;
- Critically evaluate the proposed options for management decisions and develop and justify proposals for their improvement, taking into account the criteria of socio-economic efficiency, risks and possible consequences;
- Audit IT firms, organization of multi-level protection of corporate networks;
- Master the methods of algorithmic and processor modeling of applied economic problems;
- Possess methods and basic algorithms for processing economic information structures and formalization of business processes;
- Possess the basics of modern design of business application interfaces and the ability to develop ergonomic interfaces in the field of business applications;
- Apply technologies for collecting, accumulating, extracting, structuring, distributing and using knowledge of intelligent information systems;
- To implement the company's policy in accordance with security standards and security audit;
- Calculate and analyze the cost costs of designing and indicators of the economic efficiency of information technology options, justify the choice of the best solutions;
- Create WEB platforms for business database applications;
- Master the methods of integrating the database management system into the Internet environment;
- Optimize the organization's activities and check it for compliance with standards and other similar modern standards of management quality assessment;
- Organize E-commerce taking into account regulatory and legal regulation and ethical aspects;
- Apply basic information processing algorithms to solving applied problems, evaluate the complexity of algorithms, program and test programs;
- Apply a systematic approach and mathematical methods in formalizing the solution of applied economic problems;
- Apply multimedia technologies in the development of business applications and in Internet programming;
- To evaluate investment projects under various conditions of investment and budgeting using modern software;
- Create and use the resources of global information networks;

- Analyze and calculate the efficiency of using various models of IT services such as rental of ASP applications, outsourcing, cloud computing ("cloud computing"), in-house developments, etc.
- Ready to change the infrastructure, increase efficiency, productivity and manageability of the environment based on cloud solutions;
- Support forward and reverse engineering of database management systems and is ready to apply ERwin modeling in the development and modification of business applications;
- Conduct a survey of organizations, identify information needs of users, form requirements for the information system, participate in the reengineering of applied and information processes;
- Provide consulting services to analyze the state of IT market development, audit and forecast the activities of IT firms, prospects for detailed study of various important aspects of IT business in Kazakhstan and foreign markets;
- To carry out business coaching in the field of developing business models of IT firms, engineering and reengineering of business processes, solving enterprise problems in crisis conditions.

Formulation of competency-based learning outcomes   **Form 2**

Type of competencies	Learning Outcome Code	Learning outcome (according to Bloom's taxonomy)
1. Behavioral skills and personal qualities: (Soft skills)	LO 1	Applies knowledge about society as an integral system and person, the role of historical, philosophical and spiritual processes in modern society.
	LO 2	Applies the features of the psychological and linguistic approach for implementation in pedagogical practice.
	LO 3	Applies communication skills at the level necessary for special economic purposes, business meetings and negotiations, conducting projects at the local and international level, with the involvement of foreign specialists.
	LO 4	Simulates the process of managing the commercialization of innovations in production, service and content, the innovative potential of the organization and its management.
2. Digital competencies: (Digital skills)	LO 5	Applies practical skills necessary in the field of economic justification of innovative projects and innovation management.
	LO 6	Applies modern approaches to the protection of information technology products and systems, implemented in existing domestic and international IT security standards based on blockchain technology, integrated into project management in the digital economy.
3. Professional competencies: (Hard skills)	LO 7	Simulates concepts of a computer network of physical objects equipped with built-in technologies for interaction with each other or with the external environment for further transformation of economic and social processes, excluding the need for human participation from part of actions and operations.
	LO 8	Applies modern approaches to project management, evaluates methods and explains techniques, tools of business models for creating new startups and entrepreneurship in the IT sphere.
	LO 9	Applies research and analysis tools for innovative entrepreneurship products, the main business models of innovative IT companies.
	LO 10	Applies models and tools for business administration and planning of IT companies in conditions of increased risk and diversification of the investment portfolio.
	LO 11	Models and applies business process rationalization as part of operational improvement, and introduces radical transformative elements for revolutionary business development and strategic innovation.
	LO 12	Defines the relationships and dependencies between the elements of business analysis information for the application of information technologies, taking into account internal and external factors that affect the company's activities through the prism of international business Analytics standards.
	LO 13	Uses the free Django framework, develops programs based on the Linux operating system.
	LO 14	Develops and applies web applications in the Python programming language, as well as the open multi-paradigm compiled programming language Swift to provide information support for IT projects.
	LO 15	Uses Bigdata analysis, configures software analytical solutions, selects analysis methodology, visualization and forecasting tools, and uses cloud computing for effective project work in the digital economy and IT entrepreneurship.

Definition of discipline modules in accordance with the learning outcomes

Learning Outcome Code	Name of the module	Name of disciplines	Volume (ECTS)
LO 1, LO 3	Philosophical and historical aspects of social and humanitarian knowledge	History and philosophy of science	4
LO 2, LO 3		Higher school pedagogy	4
		Management Psychology	4
LO 2, LO 3		Pedagogical practice	4
LO 2, LO 3	Professional languages	Foreign language (professional)	4
		Foreign language for special purposes	5
		Business English in IT Entrepreneurship and Digital Economy	
LO 4, LO 5	Commercialization of scientific and educational projects	High-tech entrepreneurship in small business	5
LO 4, LO 5		Commercialization of the results of scientific and scientific-technical activities	
LO 4, LO 5, LO 8		Innovation Economics and management	5
LO 4, LO 5		Innovation in IT entrepreneurship and digital economy	
LO 6, LO 15	Methodology in IT entrepreneurship and digital economy	Cryptology and blockchain	4
LO 7, LO 9		Internet of Things (IoT) in the Digital Economy (in English)	5
LO 4, LO 5, LO 8		IT project management	5
LO 9, LO 11	Project management and business planning in IT entrepreneurship	Business analysis and its methodology	5
LO 9, LO 10, LO 12, LO 15		Analysis of the effectiveness of IT entrepreneurship	
LO 9, LO 11, LO 12		Engineering and reengineering of business processes	5
LO 5, LO 10, LO 11		Teaching Techniques of the Special Disciplines	
LO 13, LO 14	Digital technologies in business processes	Programming in PL/SQL	5
		WEB technologies (Front End and Back End)	
LO 13, LO 14		Advanced Java Programming (in English)	5
		Advanced programming in Python (in English)	
LO 6, LO 7		Data analysis, visualization and Big Data	5
LO 7, LO 15		Cloud Computing	
	Scientific research work	Research practice	14
		Research work of a master's student, including internship and completion of a master's thesis	24
	Final certification	Preparation and defense of a master's thesis	8

Matrix of attainability of learning outcomes

NN п/п	Disciplines	Brief description of the discipline (30-40 words)	Number of credits	Formable learning outcomes (codes)														
				LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11	LO 12	LO 13	LO 14	LO 15
			Cycle of basic disciplines University component															
D1	History and philosophy of science	Formation of knowledge about the forms and methods of scientific, scientific and extra-scientific knowledge, the study of modern approaches to socio-humanitarian, natural science knowledge. Content of the discipline: Philosophy of Science and methodology of science. Science in the culture of modern civilization. Features of scientific knowledge. The functions of science in the life of society. Historical development of institutional forms of scientific activity. Scientific communities and their historical types.	4	+		+												
D2	Higher school pedagogy	Formation of knowledge about the theoretical foundations of pedagogy, management of the learning process in higher education. The content of the discipline: Higher school pedagogy, its specifics and categories. Modern educational paradigms. The essence and objectives of higher and postgraduate professional education. Characteristics of Kazakhstan's system of higher and postgraduate professional education. Didactics of higher education. Competence-based approach in the training of professionals.	4		+	+												
D3	Management Psychology	The purpose of the course: is to form students systematic ideas about the psychological laws of management, to disclose the specifics of the use of social psychological knowledge in the structure of the Manager, in the development of skills analysis of socio-psychological principles underlying effective management. Course content: basic concepts, theoretical positions and actual problems of psychology of management; theoretical features of psychology of management; personal features of the head.	4		+	+												
D4	Foreign language (professional)	Improving the level of proficiency of undergraduates in a foreign language to solve social and communicative tasks. Course content: mastering the skills of expressing opinions, argumentation of decisions and actions, analysis of socially significant processes and problems; free use of three main components: the sphere of communication and topics, socio-cultural cognition, linguistics.	4		+	+												
			Cycle of basic disciplines															

			Component of choice																		
D5	Foreign language for special purposes	Deepening of the general professional and intercultural orientation of training, including highly specialized and general professional spheres, in order to develop the potential of students to realize their future professional activities. Course content: methodological and linguistic basis for the development of foreign language speech for professional, general development and other purposes, special terms, the formation of a terminological vocabulary for students.	5		+	+															
	Business English in IT Entrepreneurship and Digital Economy	Formation of the ability to conduct business correspondence, writing letters, reports, resumes and other documents at a professional level. Course content: Specific terminology, sustainable business expressions. Making special presentations. Writing letters, reports, summaries and other documents at a professional level. Conducting negotiations.	5		+	+															
D6	High-tech entrepreneurship in small business	Deepening of the general professional and intercultural orientation of training, including highly specialized and general professional spheres, in order to develop the potential of students to realize their future professional activities. Course content: methodological and linguistic basis for the development of foreign language speech for professional, general development and other purposes, special terms, the formation of a terminological vocabulary for students.	5				+	+													
	Commercialization of the results of scientific and scientific-technical activities	The study of the process of commercialization of the results of scientific and intellectual activity, attracting investment, implementation of development in production and their further support. Content of the discipline: legal bases of commercialization of scientific achievements, technologies of commercialization of inventions and innovations, business plan and tender documentation of the commercialization project.	5				+	+													
D7	Innovation Economics and Management	The study of the objective foundations of the interaction of science with industrial and non-industrial branches of activity. Content of the discipline: Theory and practice of development, implementation and management of innovative processes in production and	5				+	+			+										

		economic activity. Justification and management of innovative projects, formation and decision-making on the regulation of innovation activities.																					
	Innovation in IT entrepreneurship and digital economy	Formation of an idea of modern approaches to the construction and improvement of IT management systems of the organization. Course content: Basic concepts, categories that reveal the essence of innovation in IT entrepreneurship and the digital economy, features of the development of innovation theory, patterns of development of innovation processes, theory and practice of international, national, regional and intra-company management of innovation processes, problems.	5				+	+														

Cycle of profile disciplines
University component

D8	Cryptology and blockchain	Obtaining theoretical and practical experience in the field of creating blockchain technologies in business processes and using them in the global cryptocurrency market. Course content: Shannon's description of the traditional cryptosystem. Statistical description of the source of open texts. Caesar's cipher. A simple replacement cipher. The Vigener cryptosystem. Counting the number of matches. The Kasiski method. The Vernam and Playfair cipher, permutations, Hagelien's machine, Enigma.	4						+													+
D9	Internet of Things (IoT) in the Digital Economy (in English)	Formation of knowledge about the elements of the Internet of Things device database, operating systems and programming languages. Course content: Architecture. Thing (in IoT). Electronic Data Interchange (EDI). Sensor (sensor). Augmented (expanded or mixed) reality. Industrial (Industrial) Internet of Things (Industrial Internet of Things, Iot). Intelligent Transport System (ITS). Intelligent electrical network (smart grid).	5								+		+									
D10	IT project management	Formation of theoretical and methodological foundations of IT project management of various types. Course content: Goals and boundaries of IT projects. The relationship of IT projects with the strategy of the organization. Goals and boundaries of IT projects. Approaches to defining boundaries. The relationship of IT projects with the strategy of the organization. Stakeholders of IT projects. Business requirements and user stories. Prototyping as a method of collecting requirements. Hypothesis testing. Stages of the IT project lifecycle.	5			+	+				+											

Cycle of profile disciplines
Component of choice

D11	Business analysis and its methodology	Study of the key principles and practices of business analysis for application in the current management processes of an IT organization. Course content: Technology of description and modeling of business processes of an IT firm. Analysis and key indicators of business processes. Selection of priority business pro-	5												+		+					

Code	Course	Description	Credits	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		cesses for optimization. The five-question method. The method of parallel execution of works. A method for eliminating time gaps. A method for reducing the number of inputs and outputs of a business process.																			
	Analysis of the effectiveness of IT entrepreneurship	Mastering the theoretical and practical foundations of organizing and doing business in the field of IT technologies, developing and presenting business ideas taking into account modern economic conditions, mastering the elements of technological entrepreneurship with project management based on information and analytical support Course content: Methodology, main goals and objectives of entrepreneurial activity in the field of IT. Assessment of the entrepreneurial activity of an IT firm. Management analysis of the activities of an IT firm.	5											+		+		+			+
D12	Engineering and reengineering of business processes	Formation of scientific and theoretical knowledge and skills about the content, features and practical aspects of the application of engineering processes and reengineering of business processes to improve the company's activities. Course content: General characteristics of business process reengineering. Technology of business process reengineering. The main stages of business process reengineering. Cost analysis of functions (Activity-Based Costing). Technologies of dynamic analysis of business processes. Engineering project participants and their roles.	5											+				+	+		
	Teaching Techniques in Economics	Training of a specialist who knows the structure, content, features of the subject and methodology of economic sciences; who has mastered the skills and abilities of analysis, synthesis, scientific abstraction, etc. Course content: the place of teaching methods in the system of sciences and its subject, methods of preparation and lecturing on economic disciplines, methods of preparation and conducting seminars in economic disciplines, methods of organizing independent work of students in economic disciplines, methods of using visibility, technical means and new technologies.gii in the teaching of economic disciplines, the specifics of the methodology of teaching economic disciplines in distance learning systems.	5						+									+	+		
D 13	Programming in PL/SQL	Studying PL/SQL, a procedural extension of the SQL language developed by Oracle Corporation, and Oracle relational databases and using this technology to extend and automate SQL for Oracle database administration. Course content: Introductory information about the PL/SQL language. Advantages of PL/SQL. Creating PL/SQL blocks. Recognition of PL/SQL lexical units. Data type recognition. Using scalar data types.	5															+	+		
	WEB technologies (Front End and Back End)	Formation of the basic knowledge necessary for the design and programming of web applications, formation of practical skills in designing the structure of websites, programming in HTML, ways of creating	5															+	+		

Code	Course	Description	Credits																				
		and applying cascading style sheets (CSS), creating components of multi-layered applications using JavaScript. Course content: principles of functioning of client-server web applications, methods of creating web pages using HTML and cascading style sheets (CSS).																					
D14	Advanced Java Programming (in English)	Familiarization of undergraduates with the object-oriented Java programming language, with the capabilities, syntax of the language, technology and methods of programming in the Java environment, teaching practical programming skills in Java to solve typical problems Course content: Features of the Java language and the implementation of object-oriented programming principles. Creating web applications based on servlet technology and JSP scripts (Java EE).	5																		+	+	
	Advanced programming in Python (in English)	The study of structural and object-oriented programming as the most common and effective method of software development. Course content: development of algorithms based on a structural and object-oriented approach, algorithmization and programming based on learning the PYTHON programming language, basic data structures and typical methods of processing these structures.	5																		+	+	
D15	Data analysis, visualization and Big Data	Mastering the models and methods of data mining and machine learning in the tasks of information retrieval, data processing and analysis, as well as acquiring the skills of a data scientist and a developer of mathematical models, methods and algorithms for data analysis. Course content: Innovative data collection and storage technologies (Hadoop, MapReduce, NoSQL databases, etc.).	5					+	+														
	Cloud Computing	Familiarization with the principles of organization of information systems using cloud technologies, Internet resources for the organization of cloud computing, implementation of cloud technologies. Course content: Characteristics of cloud computing. Classification of cloud computing. Service models. Types of cloud computing. Public cloud. Private cloud. Hybrid cloud storage. Types of cloud services: IaaS, PaaS, serverless services and SaaS.	5						+														+

Alignment of planned learning outcomes with the methods of teaching and assessment within the module

Learning outcomes	Planned learning outcomes for the module	Training methods	Assessment methods
LO 1	Applies knowledge about society as an integral system and person, the role of historical, philosophical and spiritual processes in modern society.	Interactive lecture	Test,
LO 2	Applies the features of the psychological and linguistic approach for implementation in pedagogical practice.	Case Methods	Colloquium,
LO 3	Applies communication skills at the level necessary for special economic purposes, business meetings and negotiations, conducting projects at the local and international level, with the involvement of foreign specialists.	Project-based learning	Presentations
LO 4	Simulates the process of managing the commercialization of innovations in production, service and content, the innovative potential of the organization and its management.	Discussion	project preparation
LO 5	Applies practical skills necessary in the field of economic justification of innovative projects and innovation management.	Inverted class (Flipped Class)	writing an essay
LO 6	Applies modern approaches to the protection of information technology products and systems, implemented in existing domestic and international IT security standards based on blockchain technology, integrated into project management in the digital economy.	round table	portfolio
LO 7	Simulates concepts of a computer network of physical objects equipped with built-in technologies for interaction with each other or with the external environment for further transformation of economic and social processes, excluding the need for human participation from part of actions and operations.	Interactive lecture	Test
LO 8	Applies modern approaches to project management, evaluates methods and explains techniques, tools of business models for creating new startups and entrepreneurship in the IT sphere.	Case Methods	Colloquium,
LO 9	Applies research and analysis tools for innovative entrepreneurship products, the main business models of innovative IT companies.	Interactive lecture	Test
LO 10	Applies models and tools for business administration and planning of IT companies in conditions of increased risk and diversification of the investment portfolio.	Case Methods	Colloquium,
LO 11	Models and applies business process rationalization as part of operational improvement, and introduces radical transformative elements for revolutionary business development and strategic innovation.	Interactive lecture	Test
LO 12	Defines the relationships and dependencies between the elements of business analysis information for the application	Interactive lecture	Test

	of information technologies, taking into account internal and external factors that affect the company's activities through the prism of international business Analytics standards.		
LO 13	Uses the free Django framework, develops programs based on the Linux operating system.	round table	Portfolio
LO 14	Develops and applies web applications in the Python programming language, as well as the open multi-paradigm compiled programming language Swift to provide information support for IT projects.	Discussion	project preparation
LO 15	Uses Bigdata analysis, configures software analytical solutions, selects analysis methodology, visualization and forecasting tools, and uses cloud computing for effective project work in the digital economy and IT entrepreneurship.	Interactive lecture	Test

Criteria for assessing the achievability of learning outcomes

Codes of LO	Criteria
LO 1	**Knows:** the main epistemological models, the nature of transformations of the concept of rationality; forms and methods of scientific, scientific and extra-scientific cognition, modern approaches to socio-humanitarian and natural science knowledge and their commensurability
	Can: formulate and solve problems that arise in the course of research activities and require in-depth professional knowledge; choose the necessary research methods, modify existing and develop new methods based on the tasks of a specific study; analyze and comprehend the realities of modern theory and practice based on the methodology of socio-humanitarian and natural science knowledge
	Owns: skills of conducting independent research and scientific and pedagogical activities that require a broad multidisciplinary education; the ability to apply methodological and methodological knowledge in conducting scientific research, pedagogical and educational work; writing scientific articles, theses, speeches at conferences, symposiums, round tables, discussions and debates
LO 2	**Knows:** the main provisions of the content of higher education, modern didactic concepts in higher education; features of the design and organization of the pedagogical process at the university, modern educational technologies; fundamentals of pedagogical skills and pedagogical techniques, management in education, management of the process of formation and development of the personality of students; the main provisions and features of the practical psychologist in the field of management activities; methods and techniques improving the efficiency of the organization
	Can: formulate and solve problems that arise in the pedagogical process and require in-depth pedagogical knowledge; analyze and comprehend the realities of modern theory and practice of higher education; diagnose and advise students taking into account the profile of future professional activity; apply knowledge in the field of theory and practice of organizing potential opportunities in the organizational sphere
	Owns: skills of conducting independent research and scientific and pedagogical activities that require a broad multidisciplinary education; the ability to apply methodological and methodological knowledge in conducting scientific research, educational and educational work; communication skills to solve problems in the field of management psychology
LO 3	**Knows:** foreign language to the extent necessary to obtain professional information from foreign sources and elementary communication at the general and professional level; general, business and professional vocabulary of a foreign language to the extent necessary for communication, reading and translation (with a dictionary) of foreign-language texts of professional orientation; basic grammatical structures of literary and spoken language
	Can: use a foreign language in interpersonal communication and professional activity; freely and adequately express their thoughts in conversation and understand the interlocutor's speech in a foreign language; conduct written communication in a foreign language, compose business letters; apply methods and means of cognition for intellectual development, improving cultural level, professional competence
	Owns: skills of expressing their thoughts and opinions in interpersonal, business and professional communication in a foreign language; various skills of speech activity (reading, writing, speaking, listening) in a foreign language
LO 4	**Knows:** a system of relations between market institutions and mechanisms of social regulation and stimulation of the development of science, education, high technologies, nanotechnology; functions and tasks of managing the processes of commercialization of the results of scientific and scientific-technical activities

	Can: formulate the process of commercialization of scientific and scientific-technical research in order to identify problem points of turning scientific results into an intellectual product
	Owns: the skills of implementing a set of organizational, technical and economic measures to address the issues of commercialization of the results of scientific and scientific-technical activities
LO 5	**Knows:** basic concepts, categories that reveal the essence of innovation in IT entrepreneurship and the digital economy, features of the development of innovation theory, patterns of development of innovation processes, theory and practice of international, national, regional and intra-company management of innovation processes in project management.
	Can: highlight the problems of managing innovation processes, develop innovative projects with positive results and access to markets
	Owns: skills of using methods of selection and evaluation of innovative projects, as well as methods of evaluation of innovative development in business administration
LO 6	**Knows:** background and history of the emergence of cryptocurrencies, the Internet of things (IoT), IT projects and their management mechanisms; economic and managerial aspects of blockchain and IT projects
	Can: analyze and choose a suitable cryptocurrency asset for investment
	Owns: the basics of cryptography; the procedure for the initial placement of tokens (ICO)
LO 7	**Knows:** features of investing in cryptocurrency assets and the Internet of things (IoT); technical aspects of creating cryptocurrency assets and the Internet of things (IoT)
	Can: create cryptocurrency assets and the Internet of Things (IoT); bring technology projects for registration and withdrawal to ICO
	Owns: the technology of creating a White Paper for a technological project; the skills of promoting a technological project within the ICO
LO 8	**Knows:** economic and managerial aspects of blockchain and IT projects; the main tools for managing and promoting a technological project within the ICO
	Can: make economic summaries of IT projects; develop a promotion plan and promote a technology project within the ICO
	Owns: skills in using methods of programming Intel Edisson devices in Python; building IoT class systems
LO 9	**Knows:** conceptual foundations and methodology of IT entrepreneurship management; basic principles and methods of organization, planning and project management
	Can: to find organizational and managerial decisions and willingness to bear responsibility for them from the standpoint of the social significance of the decisions taken in the process of IT project management and organizational transformation
	Owns: the skills of using regulatory legal documents in professional activities, including to justify the feasibility of implementing an IT project and organizational changes
LO 10	**Knows:** conceptual foundations of business analysis, methodology of project management and economic analysis, project structuring procedures; procedure for developing project estimates
	Can: develop business plans for innovative projects and conduct economic analysis
	Owns: skills in using project planning methods, project budgeting methods, methods of economic analysis of projects; methods of monitoring the progress of projects
LO 11	**Knows:** the methodology of business administration of an IT company, the main planned performance indicators of the organization; the purpose, structure and content of the main financial reports of the organization; the content and relationship of the main elements of the process of strategic planning and management of an IT company

	Can: use cost standards in the development of appropriate proposals for the implementation of the developed plans of the IT company
	Owns: business administration and planning skills of an IT company, implementation of the organization's planning and reporting work
LO 12	**Knows:** fundamentals of project engineering; methods of design justification of project engineering; methods, plans and programs of scientific research and development of engineering; scientific support of project engineering
	Can: conduct a preliminary feasibility study of design solutions, develop design and working technical documentation, execute completed design work, monitor compliance of developed projects and technical documentation with the task, standards, specifications and other regulatory documents
	Owns: skills of analyzing the external and internal environment of the organization in order to make rational management decisions based on the effective use of engineering and reengineering of innovative projects
LO 13	**Knows:** the essence, features of programming in PL/SQL, WEB technologies (FrontEnd and BackEnd); principles of functioning of client-server web applications; technologies for developing client and server parts of websites
	Can: design and program web applications, web site structures; apply methods of creating web pages using HTML and cascading style sheets (CSS)
	Owns: skills in designing the structure of websites, programming in HTML, ways to create and apply cascading style sheets (CSS), creating components of multi-layered applications using JavaScript
LO 14	**Knows:** the general syntax of Python, Java languages in functional-modular logic; principles of building the server side of web applications using Python, Java languages; methods of preparing and debugging PHP scripts and in Python, Java languages;
	Can: deploy a web development work environment: develop (write and debug code) scripts in Python, Java; implement basic algorithmic constructs using Python, Java languages; apply PHP, Python, Java library functions using reference materials; independently create web-site-level applications using PHP, Python languages
	Owns: skills of forming the user interface of a web application using Python, Java; skills of working with a web server
LO 15	**Knows:** approaches to transferring the acquired programming knowledge to other tasks and other development tools; fundamentals of cloud computing architectures and services
	Can: transfer the created web application to a real web server; select and design cloud computing architectures and services for enterprise IP
	Owns: skills of working with a web server; designing architecture and cloud computing services for enterprise IP

Graduate attributes

High professionalism in the field of economics and business
Emotional Intelligence
Adaptability to global challenges
Leadership
Entrepreneurial thinking
Global citizenship
Understanding the importance of principles and culture of academic integrity
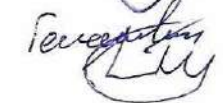
Model of a graduate of an educational program

Types of competencies	Competency description
1. Behavioral skills and personal qualities (Softskills):	Ability to abstract thinking, analysis, synthesis The ability to improve and develop their intellectual and general cultural level Willingness to act in non-standard situations, to bear social and ethical responsibility for the decisions made The ability to independently acquire and use in practice new knowledge and skills, including new areas of knowledge not directly related to the field of activity The ability to independently master new research methods, to change the scientific and scientific-industrial profile of their professional activities
2. Digital competencies (Digital skills):	The ability to use knowledge of traditional and modern problems of the history and philosophy of science in research activities in a professional direction The ability to solve psychological and pedagogical problems in the educational process of higher education, professionally possessing the skills to guide the main provisions of normative documents in planning, forecasting, analysis of the main components of the learning and education process in higher school
3. Professional competencies (Hardskills)	The ability to use socio-psychological techniques of managerial communication in the sphere of their professional activity in making organizational and managerial decisions and managing a team The ability to communicate freely, easily and convincingly in a verbal and non-verbal form in a foreign language in the professional sphere The ability to effectively commercialize the results of scientific and scientific-technical activities in accordance with the current legislation Ability to develop projects for the implementation of innovations, the introduction of technological and product innovations in IT entrepreneurship and the digital economy The ability to effectively perform and manage the work on the creation, modification and maintenance of information systems the ability to prepare analytical materials for evaluating activities in the digital economy and making strategic decisions at the micro and macro levels Ability to participate in the management of IT projects for the creation of information systems at the stages of the life cycle Ability to effectively master the methodology of innovation and entrepreneurship management in the field of IT entrepreneurship Carries out a strategic analysis of the company's activities, planning and reporting work, development of sections of current and long-term plans for the economic development of the organization Ability to evaluate and select modern operating environments and information and communication technologies for informatization and automation of solving applied problems and creating an information environment

	Ability to develop components of hardware and software complexes and databases using modern tools and programming technologies
	The ability to conduct comparative analysis and make an informed choice of algorithmic and hardware-software tools
	Ability to identify trends and analyze the current state of IT technology implementation in the global and domestic economies

Compliers:
Working Group Members:
Head of the Department of Economics and International Business, PhD, Associate Professor,   Zh.M.Zhartay
Candidate of Economics, Associate Professor   B.J. Spanova
Candidate of Economics, Associate Professor   N.N.Gelashvili
Graduate student   A.E.Turusbekov

Note:
The educational program was reviewed and recommended at the faculty council from _15. 03. 2023_ Protocol № 8
The educational program was considered at the meeting of the SMC and recommended for approval from _28. 04 2023_ Protocol № 5
The educational program was reviewed and approved at a meeting of the Academic Council from _30. 05. 2023_ Protocol № 12

Member of the Board, Vice-Rector for Academic Affairs   T.Z.Zhusipbek
Acting Director of the Academic Work Department   S.A.Smailova
Dean of the economic faculty   Zh.S. Khussainova

EDUCATIONAL PROGRAM DEVELOPMENT PLAN

7M06102 – IT-ENTREPRENEURSHIP AND DIGITAL ECONOMY

The purpose of the Plan is to contribute to improving the quality of the conditions for the implementation of the educational program, taking into account the current requirements of the labor market and the achievements of modern science.

Target indicators:

№	Indicators	Unit of measurement	2022-2023 (in fact)	2023-2024 (plan)	2024-2025 (plan)	2025-2026 (plan)
1	**Human resources development**					
1.1	Increase in the number of teachers with academic degrees	Number of people	19	+1	+1	+1
1.2	Advanced training in the teaching profile	Number of people	15	+1	+1	+1
1.3	Involvement of practitioners in teaching	Number of people	7	+1	+1	+1
2	**Promotion of the EP in the ratings**					
2.1	IQAA	Position	1	1	1	1
2.2	IAAR	Position	13	10	5	3
2.3	Atameken	Position	-	-	-	-
3.	**Development of educational and scientific-methodical literature, electronic resources**					
3.1	Textbooks	Number	-	1	1	2
3.2	Training manuals	Number	2	3	4	5
3.3	Methodological recommendations/instructions	Number	1	1	2	2
3.4	Electronic textbook	Number	2	3	4	5
3.5	Video/audio lectures	Number	1	1	2	2
4.	**Development of educational and laboratory facilities**	Number				
4.1	Purchase of software products	Number	1	2	2	2
4.2	Purchase of equipment	Number	2	2	3	3
5.	**Updating the content of the EP**					
5.1	Updating the learning outcomes and the list of disciplines taking into account the requirements of the labor market, scientific achievements, professional standards	Year			+	
5.2	Introduction to the EP of academic disciplines in foreign languages*	Year		+		
5.3	Introduction of new teaching methods	Year			+	

Head of the Department of Economics and International Business Zh. Zhartay