EDUCATIONAL PROGRAM

6B06155 Artificial Intelligence

code and name of the educational program

Level: *Bachelor's*

Approved
by the Board of Directors of JSC
«K.Kulazhanov KazUTB» "18" 0320 26
protocol No. 4

Recommended
by the Academic Council of JSC
«K.Kulazhanov KazUTB» "27" 02 20 26
protocol No. 7

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CONTENT

Preface	3
Approval sheet	4
1 Passport of the educational program	5
2 Qualification characteristics of a graduate of an educational program	5
3 Requirements for the content of the educational program	6
4 Additional educational programs (minor)	6
5 Competency map of the educational program	6
6 Learning outcomes of the educational program and modules	8
7 The relationship between the attainability of the formed learning outcomes according to the educational program and academic disciplines	12
8 Alignment of planned learning outcomes with assessment technologies and teaching methods within the module	26
9 Correlation of learning outcomes of the educational program with the labor functions of professional standards	28
10 Graduate model	29
11 Typical curriculum (appendix to the OP)	30
12 Expert opinion	35

Preface

The educational program “6B06155 Artificial Intelligence” has been developed in accordance with the requirements of the State Compulsory Standard of Higher and Postgraduate Education, approved by Order No. 2 of the Minister of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022, and based on the following professional standards: “Development of Artificial Intelligence Applications” (Appendix No. 2 to Order No. 222 of the Acting Chairman of the Board of the National Chamber of Entrepreneurs of the Republic of Kazakhstan “Atameken” dated December 5, 2022); “Professional Specialists in Information Infrastructure and IT Security” dated December 5, 2022; “Development of Big Data Processing and Storage Systems” dated December 5, 2022; the sectoral Atlas and the regional Atlas (2023–2025) of professions and competencies, including “Artificial Neural Network Designer” (https://atlasbt.enbek.kz/profession/64) and “Data Specialist” (https://enbek.kz/storage/atlas), dated February 19, 2025.

The educational program "6B06155 Artificial Intelligence" was approved at the meeting of the Council on Academic Quality from "22" 01 2026 g., protocol №. 3
Chairman Askarbekov E.B. _____

Educational program “6B06155 Artificial Intelligence” was approved at the meeting of the Academic Quality Commission of the Faculty of Engineering and Information Technologies on "21" 12 2025, protocol No. 3
Chairman Serimbetov B.A. _____

Educational program “6B06155 Artificial Intelligence” was developed and discussed at the meeting of the Department of Computer engineering and automation on "17" 11 2025, protocol No. 4
Head of Department Akishev K.M. _____

Approval sheet

Educational program 6B06155- Artificial Intelligence

AGREED:

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1 Passport of the educational program

International Standard Classification of Education (ISCED) level	6
National Qualification Framework (NQF) level	6
Sectoral Qualifications Framework (SQF) level	6
Code and name of the field of education	6B06 Information and communication technologies
Direction of training	6B061 Information and communication technologies
Number and name of the group of educational programs	B057 Information technology
Code and name of the educational program (EP	6B06155 Artificial Intelligence
Educational program profile	Higher education in the field of Information and Communication Technology
Goal of the educational program	Training of qualified specialists who possess modern technologies and methods of intelligent data processing and analysis in the field of artificial intelligence, have knowledge and practical skills that meet modern quality requirements for specialists with higher education.
Completion criterion of an educational program	240 academic credits
Language of instruction of the educational program	russian, kazakh
Distinctive features of the educational program	-
Partner University	-

2 Qualification characteristics of a graduate of an educational program

Degree awarded	Bachelor (Master) in the educational program "6B06155 Artificial Intelligence"
Field of professional activity	Analysis and processing of large data sets, statistics and forecasting, research, development, implementation, and maintenance of artificial intelligence technologies and methods in various sectors of the economy, such as: natural language processing, financial management, mobile applications, environmental analysis, computer games, transportation, healthcare, and industry.
Types of professional activities	Design and engineering Production and technological Experimental and research Organizational and managerial Operational Scientific
Object of professional activity	Enterprises and organizations involved in the production and operation of computing equipment, computer systems and networks, and software; Design, research, and educational institutions, as well as enterprises and organizations of various forms of

	ownership that apply artificial intelligence models and methods.
Functions of professional activity	1. Artificial Intelligence Systems Designer 2. Data Specialist 3. Information Dissemination Specialist ***(или)*** Information 4. Promotion Specialist 5. Machine Learning Data Specialist 6. Robotic Process Analyst 7. Digital Information Manager

3 Requirements for the content of the educational program

Name of cycles and disciplines	Workload in academic credits
Cycle of general education disciplines (GED)	**56**
Required component	51
University component	5
Cycle of basic disciplines (BD)	**89**
University component	25
Component of choice	62
Professional practice	2
Cycle of major disciplines (MD)	**87**
University component	15
Component of choice	55
Professional practice	17
Final assessment	**8**
Total	**240**

4 Additional educational programs (minor)

4.1 Minor « Economic analysis and management»

Name of disciplines	Workload in academic credits
Enterprise economics	5
Economic analysis	5
Economic risks in enterprises	5
Total	15

5 Competency map of the educational program «6B06155 – Artificial Intelligence»

Competence map of the educational program	Learning outcome code	Learning Outcome (according to Bloom's Taxonomy)
Behavioral skills and personality traits (Softskills)	LO 1	Apply the fundamentals of economics, law, financial literacy, sustainable development and life safety in professional activities, analyse financial risks and their impact on quality of life, demonstrate civic responsibility and responsible behaviour.
	LO2	Apply the rules and methods of mathematics and natural sciences to solve professional tasks in the field of information systems and technologies.
	LO $_{GED1}$	It forms a system of general competencies that ensure the socio-cultural development of the personality of a future specialist based on his ideological, civic and

		moral position, oriented towards a healthy lifestyle.
	LO GED 2	He is capable of communication in oral and written forms in Kazakh, Russian and foreign languages to solve problems of interpersonal, intercultural and professional communication.
	LO GED 3	Promotes the development of information literacy through the acquisition and use of modern information and communication technologies in all fields of activity
Digital competencies (Digital skills)	LO3	Develop neural network models to solve specified tasks, applying the basic concepts and components of neural networks, and manage the processes of creating and using information services.
	LO4	Apply modern information security methods to ensure organizational system security and information security within an enterprise.
	LO5	Apply modern algorithms, methods, and technologies in the design and development of software, including artificial intelligence and expert systems, and participate in organizing and managing their development processes.
	LO6	Apply various platforms and programming languages, analysing the results of program code execution.
Professional skills (Hardskills)	LO7	Implement prototypes of intelligent systems based on existing artificial intelligence models using programming languages.
	LO8	Implement development processes, requirements specification, and fundamental principles of software engineering by using modern programming languages and deploying scalable applications based on modern libraries and frameworks.
	LO9	Apply modern methods of design and modelling of software applications and information systems.
	LO10	Analyse large volumes of data based on scientific research for event forecasting and managerial decision-making using artificial intelligence.
	LO11	Analyse economic indicators, proposing effective strategies for solving enterprises' economic problems, using basic methods of analysis and evaluation with the application of software tools.

6 Learning outcomes of the educational program and modules

Key com-petenci	Learning Outcomes (LO) for the educational program	Name of module	Learning outcomes for the module	Name of disciplines that form learning outcomes
	LO_{GED1} - It forms a system of general competencies that ensure the socio-cultural development of the personality of a future specialist based on his ideological, civic and moral position, oriented towards a healthy lifestyle.	Man and society are the basis of ideological and socio-political knowledge	He applies the basic laws of the history of Kazakhstan, philosophy, socio-political knowledge for effective socialization and adaptation in changing socio-cultural conditions, forming a personality capable of mobility in the modern world, critical thinking and physical self-improvement.	History of Kazakhstan
				Philosophy
				Physical Culture
				Module of socio-political knowledge (political science, sociology, cultural studies, psychology)
	LO_{GED2} - He is capable of communication in oral and written forms in Kazakh, Russian and foreign languages to solve problems of interpersonal, intercultural and professional communication.	Information and communication module	He is able to classify software, use it for its intended purpose, structure and interpret it as needed, as well as manage software products developed by himself.	Kazakh (Russian) language
				Foreign language
				Information and communication technologies
	LO_{GED3}- Promotes the development of information literacy through the acquisition and use of modern information and communication technologies in all fields of activity		He is proficient in various types of information and communication technologies for the search, storage, processing, protection and dissemination of information	
	LO1- Apply the fundamentals of economics, law, financial literacy, sustainable development and life safety in professional activities, analyse financial risks	Module of economic, legal, scientific and environmental knowledge	Using basic economic and legal principles, financial awareness, and civic responsibility in behavior, he applies knowledge of economics and law, as well as entrepreneurial and financial literacy skills, as well as waste management,	Module of economics, entrepreneurship, law and financial literacy (fundamentals of economics and entrepreneurship, basics of law and anti-corruption culture, basics of financial literacy)

	and their impact on quality of life, demonstrate civic responsibility and responsible behaviour.		ecosystem restoration, disaster risk reduction, investments in the green economy, and the introduction of energy-saving technologies. Understanding the main stages of scientific research, from choosing a topic to publishing the results.	Sustainable development, ecology and life safety
	LO2 - Apply the rules and methods of mathematics and natural sciences to solve professional tasks in the field of information systems and technologies.	Mathematics	Uses basic mathematical formulas, knowledge in solving applied problems, and mathematical methods in constructing models for solving problems of an applied nature and mathematical methods. the main types of selection and decision-making tasks, their formulation and implementation, methods and models used in the design of human-machine systems for selection and decision-making.	Mathematical analysis
				Linear algebra
				Probability theory and mathematical statistics.
				Numerical methods
				Theory of decision-making
				AI-Decision-Making Approaches
Цифровые компетенции (Digital skills)	LO3 – Develop neural network models to solve specified tasks, applying the basic concepts and components of neural networks, and manage the processes of creating and using information services.	Architecture of Neural and Computer Networks.	Studies the fundamental principles and methods of artificial neural network development. Covers neural network architectures, learning algorithms, optimization techniques, and their applications. Provides theoretical and practical knowledge in the design, implementation, and use of artificial intelligence models.	Development of artificial neural networks
				Introduction to Neural Network architectures
				Computer networks and cloud technologies
				Representation of data and knowledge on the web
	LO4 - Apply modern information security methods to ensure organizational system security and information security within an enterprise.	Cryptography, Cloud Technologies, and Data Security.	Provides theoretical and practical knowledge of cloud computing technologies and the management of processes related to the development and use of information services. Develops skills in designing secure and ethical artificial intelligence solutions in accordance with modern information security requirements.	Cryptographic methods of information protection
				Industrial practice 2
				Information security and information protection
				Safely and ethics of AI
	LO5 – Apply modern algorithms, methods, and technologies in the design and development of software, including artificial	Algorithmization and programming languages	Uses language tools to describe various data structures, develops efficient data processing algorithms in well-known programming languages, understands the basics of Python programming	Algorithms, data structures, and programming (SI)
				Basics of programming in a language Python

	intelligence and expert systems, and participate in organizing and managing their development processes.		syntax and logic, the principles of algorithms, data structures, and basic code correction methods. Increases competence in the field of software development and standardization, demonstrates the ability to apply the concept of object-oriented programming, develop, debug and test Java programs in the Eclipse environment.	Modern programming methods and tools
	LO6- Apply various platforms and programming languages, analysing the results of program code execution.			Cross-platform programming
				Object-oriented programming (Java)
				Network administration
				Web programming
				Visual programming
				Educational practice
Профессиональные навыки (Hardskills)	LO7 – Implement prototypes of intelligent systems based on existing artificial intelligence models using programming languages.	Artificial intelligence and data mining	It uses basic concepts and tasks such as speech recognition, machine translation, tonality analysis, and text generation. It uses artificial intelligence methods and technologies to effectively manage objects. Implements hardware models of neural network elements, choosing an architecture that corresponds to the hardware for performing calculations in artificial intelligence tasks. It is able to create prototypes of an intelligent system based on existing artificial intelligence models.	Artificial intelligence systems
				Natural language processing
				Artificial intelligence in the management of object
				Pre-graduate practice / Industrial practice
				Image processing in artificial intelligence systems
				Deep Machine learning
				Mathematical models of artificial intelligence
				Hardware and software implementation of artificial intelligence elements
				Modern statistical methods of forecasting
				Artificial intelligence and cognitive systems
				Social media analysis and data visualization
				Intelligent control systems
				Big Data Processing (Big data)
	LO8 – Implement development processes, requirements specification, and fundamental principles of software engineering by using modern programming	Programming software applications	Demonstrates skills in designing relational database structures, managing data in SQL, ensuring data integrity and security, and integrating information systems using DBMS. Creates and implements innovative solutions using virtual and augmented	Industrial practice 1
				Programming of mobile applications (iOS and Android)
				Design and development of information

	languages and deploying scalable applications based on modern libraries and frameworks.		reality technologies in various fields of activity. Applies principles of construction for the application of predictive models, provides an overview and description of the classification and clustering of forecasting, domain analysis using forecasting methods and models in various tasks, skills in choosing methods and tools of artificial intelligence to solve problems	system architectures
				Virtual and augmented reality technologies
				Scientific approaches for information analysis
	LO9- Apply modern methods of design and modelling of software applications and information systems.			Artificial intelligence tools in solving forecasting problems Visual programming and data mining.
				Development of game applications on modern platforms
				Information technology in the design of computer games
	LO10 - Analyse large volumes of data based on scientific research for event forecasting and managerial decision-making using artificial intelligence.	Organization of modern systems and technologies	Understands the principles of designing, developing, and controlling robots, as well as the basics of integrating Internet of Things (IoT) devices, including sensors, actuators, and microcontrollers. Analyzes the management of processes, memory, and I/O in operating systems. Demonstrates the ability to use knowledge of computer architecture, organization of computer systems	Operating systems
				Computer data processing systems
				Engineering Computer Graphics
				Reliability of information systems
				Computer organization and system programming
				Modern data mining tools and technologies
				Robotics and IoT technologies
				Fundamentals of scientific research
				Final assessment
	LO11 - Analyse economic indicators, proposing effective strategies for solving enterprises' economic problems, using basic methods of analysis and evaluation with the application of software tools.		Forms analytical and creative thinking, understands and applies the basic methods of economic analysis at various stages of management decision-making, and also acquires practical skills in analyzing and evaluating the production, economic, financial and investment activities of an organization. He is able to operate with economic indicators, analyze and propose effective strategies for solving economic problems of enterprises, taking into account the peculiarities of their functioning in modern market conditions.	Economic analysis
				Economics of enterprise
				Economic risks at enterprises

7 The relationship between the attainability of the formed learning outcomes according to the educational program and academic disciplines

№	Name of the discipline	Brief description of the discipline	Number of credits	Formed learning outcomes (codes)													
				LO_{GED1}	LO_{ED2}	LO_{ED3}	LO 1	LO 2	LO 3	LO 4	LO 5	LO 6	LO 7	LO 8	LO 9	LO 10	LO 11
Cycle of general education disciplines University component/Elective component																	
1	Foreign Language	The goal of the curriculum shall be the formation of intercultural communicative competence of students in the process of foreign language education at a sufficient level (A2, common European framework) and the level of basic sufficiency (B1, common European framework). The course content entails a sequential study of language proficiency levels by integrating social, socio-cultural, and academic-professional communication spheres. Upon completion of the discipline, student will be able to articulate potential solutions to contemporary issues in a foreign language, utilizing evidence-based information and reasoned arguments.	10		+												
2	Kazakh/Russian language	The purpose of the program - to teach the Kazakh (Russian) language in accordance with international standards for teaching languages, to increase the importance of the Kazakh language as the state language and the Russian language as a medium for intercultural and professional communication, developing competence in the use of the Kazakh (Russian) language by a future specialist as a means of communication in scientific, socio-cultural, political, professional spheres of public life. Upon completion of the curriculum, the student shall show competence in conditions of personal, social and professional communication in accordance with the peculiarities of the language, culture, communication situation.	10		+												
3	Information and communication	The purpose of the program is to develop the ability to critically evaluate and analyze processes, methods of searching, storing	5			+											

	technologies	and processing information, and methods of collecting and transmitting information through digital technologies. Studies the fundamentals of working with information, digital technologies, and computer systems; the application of software, internet services, and ICT in professional and research activities; information security; and artificial intelligence technologies. Upon completion of the discipline, student will be able to utilize digital technologies to develop data analysis and management tools for various fields of activity.																
4	Physical culture	The goal of the curriculum shall be the formation of socio-personal competences of students and the ability to purposefully use the means and methods of physical culture for conservation, promotion of health to prepare for professional activities; to take physical stress, mental stress and adverse factors in their future activities. Upon completion of the curriculum, the student shall to use a variety of forms and types of physical activities for healthy life, active recreation and leisure.	8	+														
5	The history of Kazakhstan	The purpose of the discipline shall be to give objective knowledge about the main stages in the development of the history of Kazakhstan from ancient times to the present. The program consists of 5 thematic blocks: Ancient people and the formation of a nomadic civilization, Turkic civilization and the Great Steppe, Kazakhstan in a new era (XVIII-early XX centuries), Kazakhstan in the Soviet period, and Independent Kazakhstan. Upon completion of the discipline, student applies skills of analytical, axiological, critical analysis in the study of historical processes for an objective understanding of the modern Kazakh model of development.	5	+														
6	Module of socio-political knowledge (political science, sociology,	The objective of the discipline is to form the socio-humanitarian worldview of learners in the context of addressing the tasks of modernizing public consciousness, encompassing the interdisciplinary study of sociology, political science, cultural studies, and psychology while integrating principles of inclusion	8				+											

	cultural studies, psychology)	and the «Adal Azamat» (Honest Citizen) value orientations as fundamental pillars for the development of modern society. Upon completion of the discipline, the student interprets socio-humanitarian knowledge and ethical values based on scientific methods of social analysis, participates in conflict resolution, and provides reasoned advocacy for positions regarding the modernization of Kazakhstan.																	
7	Philosophy	The purpose of the program is to develop students' holistic understanding of philosophy as a special form of knowledge of the world, its main branches, problems, and methods of their study in the context of future professional activity. The discipline covers the key directions in the emergence and development of philosophy, the foundations of the philosophical understanding of the world, the philosophy of the human being, and the world of values. Upon completion of the discipline, student argue their own moral position regarding relevant issues of contemporary global society..	5	+															
8	Module of economics, entrepreneurship, law and financial literacy (fundamentals of economics and entrepreneurship, basics of law and anti-corruption culture, basics of financial literacy)	The discipline is aimed at developing entrepreneurial thinking, financial responsibility, legal literacy, fostering an anti-corruption culture, and commitment to the principles of law and order in a market economy. Its content includes the fundamentals of economics, entrepreneurship, financial literacy, law, anti-corruption culture. As a result of studying the discipline, the student has the skills to make effective economic decisions, ensure legal protection, apply financial literacy, and adhere to anti-corruption practices.	5				+												
The cycle of basic disciplines The university component																			
9	Algorithms, Data Structures, and	The discipline is aimed at developing knowledge about the methods of developing software solutions in the C language. The	5								+	+							

	Programming (C)	content covers the construction and analysis of algorithms, the use of linear and nonlinear data structures (arrays, lists, stacks, queues, trees), memory management, and code optimization. As a result of studying the discipline, the student applies the basic algorithms and data structure in C to solve applied problems.																
10	Linear Algebra	The discipline is aimed at developing fundamental knowledge about mathematical methods for solving typical problems. The content covers solving problems on complex numbers, matrix rings, polynomials, second- and third-order determinants, systems of linear algebraic equations, the Horner's, and Bezout's theorem. As a result of studying the discipline, the student applies elements of linear algebra to solve problems of an applied nature and build mathematical models.	5					+										
11	Mathematical Analysis	The discipline is aimed at forming fundamental knowledge of mathematical analysis. The content of the discipline covers the basic concepts of mathematical analysis, limits and continuity of functions, functions of several variables, differential calculus, indefinite and definite integrals, as well as series. As a result of mastering the discipline, the student models applied problems using the apparatus of probability theory and mathematical statistics.	4					+										
12	Artificial Intelligence Systems	The discipline is aimed at the formation of knowledge about the principles of building and functioning of intelligent systems. The content of the discipline covers the basics of artificial intelligence, machine learning methods, neural networks, expert systems, data processing, pattern recognition, intelligent information analysis and the basics of building intelligent software systems. As a result of studying the discipline, the student develops intelligent software solutions through the introduction of artificial intelligence methods.	5											+				
13	Sustainable Development, Ecology and Life Safety	This discipline is designed to cultivate a systemic understanding of the principles of balancing economic development, social well-being, environmental preservation, and the protection of human life and health. It covers key issues in ecology,	5				+											

		environmental protection, life safety, and sustainable development. Upon completion of the course, students will be able to apply the principles of sustainable development, environmental safety, and occupational health and safety to manage energy and waste within a circular economy framework.																
14	Fundamentals of Scientific Research	The discipline is aimed at developing knowledge about the methods and principles of scientific research. The content of the discipline covers the methods of scientific knowledge, the stages of research, setting goals and objectives, working with scientific information, methods of data analysis, design of research results, the basics of academic writing and scientific ethics. As a result of mastering the discipline, the student performs projects and practical tasks on research activities.																
15	Introduction to the Specialty	The discipline is aimed at developing initial professional skills and an understanding of the application areas of artificial intelligence. The course content includes the study of the history of artificial intelligence development, core technologies and AI methods, application areas of intelligent systems, and current trends in this field. As a result of studying the discipline, students perform basic practical programming tasks in the field of artificial intelligence technologies.																
The cycle of basic disciplines Component of choice																		
16	Web Programming	The discipline is aimed at developing the fundamentals of creating web applications and websites. The content of the discipline covers the basics of client-server architecture, HTML, CSS, JavaScript, user interface development, server-side development, working with databases, and the principles of creating web services. As a result of studying the discipline, the learner develops web applications and websites using modern web technologies.	5								+	+						
17	Visual Programming	The discipline is aimed at developing the knowledge and skills to create software applications using visual development environments. The discipline's content covers the basics of	5								+	+						

		algorithmization, working in visual programming environments, creating user interfaces, event processing, and the principles of object-oriented programming. As a result of studying the discipline, the student develops applications using visual programming environments and graphical components.																
18	Engineering Computer Graphics	The discipline is aimed at developing knowledge about the methods of graphical representation of technical information and the basics of drawing using computer tools. The content of the discipline covers the basics of descriptive geometry, rules for the execution of engineering drawings, standards for design documentation, projection methods, creation of 2D and 3D models, work in computer-aided design (CAD) systems. As a result of studying the discipline, the student designs engineering drawings and 2D and 3D models using computer graphics systems.	5														+	
19	Reliability of Information Systems	The discipline is aimed at developing knowledge about the principles of ensuring stable and trouble-free operation of information systems. The content of the discipline covers the concept of reliability of information systems, types of failures, failures, methods of reliability assessment, redundancy, data recovery, fault tolerance, information integrity control, methods of ensuring security, stability of systems and risk analysis. As a result of studying the discipline, students simulate the operation of systems under various operating conditions.	5														+	
20	Cryptographic Methods of Information Protection	The discipline is aimed at developing knowledge about the principles and methods of cryptographic data protection. The content of the discipline covers the basics of cryptography, symmetric and asymmetric cryptosystems, hash functions, electronic signatures, encryption and decryption methods, information security protocols, and the basics of cryptanalysis. As a result of studying the discipline, the student implements cryptographic methods of information protection.	5						+	+								
21	Information Security and	The discipline is aimed at developing knowledge about the principles of information system security and data protection.	5						+	+								

	Information Protection	The content of the discipline covers information security threats, information security methods, cryptographic tools, access control, network security, operating system protection, organizational and technical measures to ensure data security. As a result of studying the discipline, students develop basic measures to ensure the security of information systems.																	
22	Natural Language Processing	The discipline is aimed at developing knowledge about methods of analyzing, understanding and generating textual information in natural language using computer technology. The content of the discipline covers the basics of text processing, tokenization, feature extraction, text representation models, machine learning methods, tonality analysis and text classification. As a result of studying the discipline, the student performs the tasks of tokenization, lemmatization and syntactic analysis of the text.	5										+						
23	Artificial Intelligence in the Management of Object	The discipline is aimed at developing knowledge about the use of artificial intelligence methods for managing technical and information objects. The content of the discipline covers the basics of intelligent control, machine learning methods, neural networks, modeling of control objects, data processing and the use of AI algorithms. As a result of studying the discipline, the student develops intelligent control systems for automating and optimizing the operation of facilities.	5										+						
24	Computer Networks and Cloud Technologies	The discipline is aimed at developing knowledge about the construction and use of network infrastructure and cloud services. The content of the discipline covers the basics of computer networks, network protocols, data transmission models, routing, network security organization, principles of cloud computing, cloud service models and virtualization technologies. As a result of mastering the discipline, the student sets up computer networks, uses cloud technologies for data storage and processing.	4						+	+									
25	Representation of Data and Knowledge on the	The discipline is aimed at the formation of knowledge about the methods of structuring, storing, transmitting data and knowledge in network information systems. The content of the discipline	4						+	+									

	Web	includes consideration of knowledge representation models, semantic networks, ontologies, technologies of organization and data exchange in network environments. As a result of studying the discipline, the student administers computer networks and cloud services for data storage and processing.																
26	Operating Systems	The discipline is aimed at developing knowledge about the principles of organization, functioning and resource management of modern operating systems. The content of the discipline covers the architecture of operating systems, process and thread management, RAM allocation, file systems, I/O, task planning, multitasking, security and data protection in the operating system. As a result of studying the discipline, the student adjusts the basic functions of operating systems for the effective operation of programs and equipment.	5														+	
27	Computer Data Processing Systems	The discipline is aimed at the formation of knowledge about the functioning and application of computer systems for information processing. The content of the discipline covers the architecture of computer systems, the principles of data storage, processing, and transmission, the operation of operating systems, the organization of computing processes, the basics of network technologies, and data management software. As a result of studying the discipline, the student develops simple algorithms for data processing using programming.	5														+	
28	Cross-Platform Programming	The discipline is aimed at developing knowledge and skills for developing software applications running on various operating systems and devices. The content of the discipline covers the principles of cross-platform development, application architecture, frameworks, interface development, API work, data management, adaptation, application testing and deployment. As a result of studying the discipline, the student develops cross-platform applications using modern frameworks and technologies.	5									+	+					
29	Probability Theory and	The discipline is aimed at forming knowledge of probability theory and statistical systems, as well as the regularities of their	5					+										

	Mathematical Statistics.	construction and management. The content of the discipline covers probability theory, elements of combinatorics, discrete random variables, statistical populations, and problems involving sample regression equations. As a result of studying the discipline, the student performs applied calculations using probability theory and elements of mathematical statistics.																	
30	Numerical Methods	The discipline is aimed at the formation of knowledge about the methods of approximate solution of mathematical problems. The content of the discipline covers numerical methods for solving equations, systems, linear algebra methods, interpolation, approximation of functions, numerical differentiation, integration, solution of differential equations, error estimation, stability of calculations and analysis of results. As a result of studying the discipline, the student solves applied mathematical problems using numerical methods and evaluates computational errors.	5					+											
31	Theory of Decision-Making	The discipline is aimed at developing knowledge about the principles and methods of making informed decisions in conditions of uncertainty. The content of the discipline covers the classification of decision-making tasks, criteria for choosing alternatives, methods of multi-criteria analysis, expert assessments, elements of game theory and the basics of modeling managerial decisions. As a result of studying the discipline, the student applies the methods of decision theory to select optimal alternatives.	4					+											
32	AI-Decision-Making Approaches	The discipline is aimed at developing knowledge about the use of artificial intelligence methods to support decision-making. The content of the discipline covers the basics of intelligent systems, machine learning, neural networks, expert systems, data analysis methods, classification, forecasting and optimization of solutions. As a result of studying the discipline, the student implements AI methods in applied tasks of data management and analysis.	4					+											

33	Object-Oriented Programming (Java)	The discipline is aimed at the formation of systematic knowledge and practical skills in the field of object-oriented programming. The content of the discipline covers the basics of the Java language, classes and objects, encapsulation, inheritance and polymorphism, interfaces, exception handling, working with collections, the basics of multithreading and the development of object-oriented applications. As a result of studying the discipline, the student develops software solutions using object-oriented principles in the Java language.	5								+	+					
34	Network Administration	The discipline is aimed at developing knowledge about computer networks, their configuration and administration. The content of the discipline covers the architecture of computer networks, network protocols, network equipment configuration, IP addressing management, server administration, network security, monitoring and diagnostics of network connections. As a result of studying the discipline, the student Configures IP addresses, ensuring correct network addressing of devices.	5								+	+					
35	Computer Organization and System Programming	The discipline is aimed at developing knowledge about the principles of building hardware and system software for computing systems. The discipline's content covers computer architecture, processor, memory, instruction set, hardware-software interaction, system programming, and operating system interfaces. As a result of studying the discipline, the student analyzes the operation of memory, registers, processor and computing processes at the system level.	5													+	
36	Modern Data Mining Tools and Technologies	The discipline is aimed at developing knowledge about methods and software tools for processing and analyzing large amounts of data. The discipline's content covers data mining methods, machine learning, clustering, classification, associative rules, big data processing, data analysis tools, and result visualization technologies. As a result of studying the discipline, students develop data mining models and visualize the results to make informed decisions.	5													+	

37	Basics of Programming in a Language Python	The discipline is aimed at developing knowledge about the basic principles of developing Python programs. The discipline's content covers Python syntax, data types, control structures, functions, working with lists, dictionaries, the basics of object-oriented programming, and working with files. As a result of studying the discipline, the student develops basic programs using visual programming tools to solve applied problems.	4								+	+						
38	Modern Programming Methods and Tools	The discipline is aimed at developing knowledge about modern approaches, technologies and software development tools. The discipline's content covers the principles of structural and object-oriented programming, development environments, frameworks, libraries, modular programming, testing, debugging, and software system development methods. As a result of studying the discipline, the student develops software applications using modern programming methods and tools.	4								+	+						
		Cycle major disciplines The university component																	
39	Introduction to Neural Network Architectures	The discipline is aimed at developing knowledge about the basic types and principles of building neural networks. The content of the discipline covers the main architectures of neural networks, fully connected, convolutional and recurrent networks, activation functions, learning methods, data representation and application of neural networks. As a result of studying the discipline, the student develops neural networks for information analysis and processing.	5						+	+								
40	Development of Artificial Neural Networks	The discipline is aimed at developing knowledge about the principles of building, learning, and applying neural networks. The content of the discipline covers the basics of neural networks, network architecture, activation functions, learning methods, model optimization, working with data, deep learning and the use of neural networks to solve applied problems. As a result of studying the discipline, the student applies neural network training methods to solve classification, prediction, and recognition problems.	5						+	+								

The cycle of profile disciplines Component of choice																			
41	Artificial Intelligence and Cognitive Systems	The discipline is aimed at studying the principles and technologies of artificial intelligence and cognitive systems used to model human intellectual activity and solve complex information processing problems. The content of the discipline includes consideration of artificial intelligence methods, cognitive models, intelligent data processing algorithms and decision support systems. As a result of studying the discipline, the student models intellectual and cognitive processes using AI methods.	5										+					
42	Social Media Analysis and Data Visualization	The discipline is aimed at studying the methods of data analysis of social networks and information visualization technologies to identify patterns and present the results of the analysis. The content of the discipline includes the study of methods for analyzing social graphs, processing big data, visualization tools and technologies for presenting analytical information. As a result of studying the discipline, the student visualizes data using modern tools.	5										+					
43	Hardware and Software Implementation of Artificial Intelligence Elements	The discipline is aimed at studying knowledge about the principles of hardware and software implementation of artificial intelligence elements. The discipline's content covers the architecture of artificial intelligence systems, hardware platforms for AI, microprocessors and specialized accelerators, software frameworks, neural networks, computational optimization methods, integration of hardware and software components, and the basics of embedded AI systems. As a result of studying the discipline, the student develops AI elements using hardware and software.	5										+					
44	Modern Statistical Methods of Forecasting	The discipline is aimed at studying modern statistical methods of forecasting and data analysis. The content of the discipline covers the basics of forecasting, time series, regression analysis, smoothing methods, extrapolation, estimation of model parameters, forecasting error analysis and the use of statistical	5										+					

		methods for data processing. As a result of studying the discipline, the student develops forecasting models based on statistical data.																
45	AI Safety and Ethics	The discipline is aimed at studying the principles of ensuring security and the ethical aspects of the application of artificial intelligence systems. The course content includes the study of issues related to the reliability and security of AI systems, data protection, developer responsibility, and ethical standards for the use of artificial intelligence technologies. As a result of studying the discipline, students develop solutions to ensure the security and ethical use of artificial intelligence systems, applying data protection principles and ethical standards.	5						+	+							
45	Cloud Databases	The discipline is aimed at developing knowledge of the principles of organizing and using databases in a cloud environment. The course content includes cloud database architecture, data storage models, distributed systems, replication, scalability, data integrity and security assurance, working with cloud database management systems, and query optimization methods. As a result of studying the discipline, students administer databases in cloud environments.	5						+	+							
47	Artificial Intelligence Tools in Solving Forecasting Problems	The discipline is aimed at forming ideas about modern tools and methods of artificial intelligence used for data analysis and solving forecasting problems in various fields. The content of the discipline includes the study of machine learning methods, data mining, forecasting models and big data processing tools. As a result of studying the discipline, students build predictive models using artificial intelligence tools analyzing data.	5											+	+		
48	Visual Programming and Data Mining	The discipline is aimed at developing knowledge about the principles of visual programming, data mining methods for processing and interpreting information. The content of the discipline includes the study of visual programming tools, data analysis methods, algorithms for identifying patterns and visualization of results. As a result of studying the discipline, students develop applications using visual tools and methods of	5											+	+		

		intellectual analysis.																
49	Deep Machine Learning	The discipline is aimed at developing deep machine learning methods and algorithms for solving complex data analysis problems. The content of the discipline includes the study of neural network architectures, deep model learning methods, big data processing and the application of deep learning in various fields. As a result of studying the discipline, the student develops deep machine learning models for data analysis and processing.	5										+				
50	Mathematical Models of Artificial Intelligence	The discipline is aimed at developing knowledge of the principles of designing and functioning automatic and intelligent control systems. The content of the discipline covers the fundamentals of control theory, methods of artificial intelligence in control, adaptive and self-learning systems, neural networks, fuzzy logic, models of controlled systems, algorithms for optimization and decision-making. As a result of studying the discipline, the student develops intelligent systems for the automatinon and optimization of control processes.	5										+				
51	Intelligent Control Systems	The discipline is aimed at developing knowledge of the principles of designing and functioning automatic and intelligent control systems. The content of the discipline covers the fundamentals of control theory, methods of artificial intelligence in control, adaptive and self-learning systems, neural networks, fuzzy logic, models of controlled systems, algorithms for optimization and decision-making. As a result of studying the discipline, the student develops intelligent systems for the automatinon and optimization of control processes.	5										+				
52	Big Data Processing (Big Data)	The discipline is aimed at developing knowledge of the principles of organizing and using databases in a cloud environment. The course content includes the study of cloud database architecture, methods of data storage and processing, and technologies for data management and security in cloud platforms. As a result of studying the discipline, students optimize the processes of collecting, storing, and analyzing big	5										+				

		data for solving applied tasks.															
53	Development of Game Applications on Modern Platforms.	The discipline is aimed at developing knowledge about the principles of game application development on modern software and hardware platforms. The content of the discipline covers the basics of game development, game engines, game architecture, game logic programming, graphics and animation, physics, user interface, sound, optimization and publishing of games. As a result of studying the discipline, the student develops game applications for modern platforms.	5											+	+		
54	Information Technology in the Design of Computer Games	The discipline is aimed at the formation of knowledge in the field of information technology application in the creation of computer game design. The content of the discipline covers the basics of game design, designing game scenarios, working with graphics and multimedia, using game engines, creating 2D and 3D objects, animation, interface solutions and integration of game elements. As a result of studying the discipline, the student develops game scenes, objects and interfaces using digital tools.	5											+	+		
55	Virtual and Augmented Reality Technologies	The discipline is aimed at developing an understanding of modern virtual reality technologies and their application in various fields. The course content includes the study of the principles of creating virtual environments, tools and instruments for VR application development, visualization technologies, and user interaction with virtual objects. As a result of studying the discipline, students develop interactive VR and AR applications using graphical and sensor technologies.	5											+	+		
56	Economic Analysis (Minor)	The discipline is aimed at developing knowledge in the field of economic analysis. The content covers the principles of economic analysis, methods for analyzing financial, production, and management indicators, assessment of resource efficiency, diagnostics of the enterprise's financial condition, as well as tools for planning, monitoring, and making management decisions based on analysis. As a result of studying the discipline, the student justifies management decisions based on the results of	5														+

		economic analysis to assess the efficiency of the enterprise's activities.																
57	Scientific Approaches for Information Analysis	The discipline is aimed at developing an understanding of scientific approaches and methods of information analysis. The course content includes the fundamentals of scientific knowledge, methods of data collection and processing, statistical data analysis, modeling of information processes, methods of comparison and interpretation of results, and the fundamentals of formalization and systems analysis. As a result of studying the discipline, students apply methods of scientific information analysis for data processing and interpretation of results.	5											+	+		
58	Image Processing in Artificial Intelligence Systems	The discipline is aimed at developing knowledge about image processing and analysis methods in artificial intelligence systems. The discipline's content covers the basics of digital image processing, image filtering and transformation, segmentation, feature extraction, machine and deep learning methods, object recognition, and the basics of computer vision. As a result of studying the discipline, the student models the processes of processing and analyzing visual data using artificial intelligence methods.	5										+				
59	Programming of Mobile Applications (Ios And Android)	The discipline is aimed at developing knowledge about the principles of mobile software development for modern platforms. The content of the discipline covers the basics of mobile development, the architecture of iOS and Android applications, user interfaces, working with APIs, data storage, interaction with sensors, platform services, principles of application publishing and testing. As a result of studying the discipline, the student develops mobile applications for iOS and Android, implementing their main functions.	5											+	+		
60	Design and Development of Information System Architectures	The discipline is aimed at developing knowledge about the principles of building and designing the architecture of modern information systems. The content of the discipline covers models and architecture of information systems, principles of system design, component and service-oriented approaches, integration	5											+	+		

		of software components, database design, distributed systems, scalability and reliability. As a result of studying the discipline, the student designs structural solutions for software systems using modern approaches to building information systems.																
61	Economic Risks at Enterprises (Minor)	The discipline is aimed at developing an understanding of economic risks at enterprises and methods of their management. The content covers risk classification, sources and factors, methods of identification, assessment and analysis, and tools for risk mitigation. As a result, students analyze economic risks and justify measures for their reduction.	5															+
62	Robotics and IoT Technologies	The discipline is aimed at mastering the principles of development and application of robotic systems and Internet of Things technologies. The content of the discipline covers the basics of robotics, the architecture of robotic systems, sensors and actuators, microcontrollers, robot programming, the basics of IoT, device networking, data collection and processing, principles of automation and control. As a result of studying the discipline, the student develops robotic devices and IoT systems.	5														+	
63	Enterprise Economics (Minor)	The discipline is aimed at forming fundamental knowledge of the functioning of an enterprise as a key economic entity in the modern economy. The content covers the characteristics of enterprise activities, the use of fixed and current assets, management of labor resources, the remuneration system, and production costs. As a result of studying the discipline, the student analyzes the efficiency of an enterprise based on the calculation of key economic indicators.	5															+

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

Learning Outcomes (LO) Number	Planned learning outcomes for the module	Assessment technologies (tools)	Methods of learning and teaching
LO_{GED1}	He applies the basic laws of the history of Kazakhstan, philosophy, socio-political knowledge for effective socialization and adaptation in changing socio-cultural conditions, forming a personality capable of mobility in the modern world, critical thinking and physical self-improvement.	Lectures, presentations, independent work with educational, scientific, and informational literature.	Oral questioning and individual interviews, testing on the topics covered, assessment of participation in discussions and debates, assessment of individual and group assignments.
LO_{GED2}	He is able to classify software, use it for its intended purpose, structure and interpret it as needed, as well as manage software products developed by himself.	Role-playing games and modeling of professional situations. Discussions, debates, and thematic conversations.	Role-playing and situational tasks, assessment of participation in discussions and debates, peer assessment and self-assessment, portfolio of language and communication achievements.
LO_{GED3}	He is proficient in various types of information and communication technologies for the search, storage, processing, protection and dissemination of information	Search, analysis, systematization, and presentation of digital information; completion of mini-projects using modern information technologies.	Computer-based and online testing, practical assignments using information and communication technologies (ICT), assessment of information search, analysis, and processing skills.
LO1	Apply the fundamentals of economics, law, financial literacy, sustainable development and life safety in professional activities, analyse financial risks and their impact on quality of life, demonstrate civic responsibility and responsible behaviour.	Testing, presentation, essay, calculation assignment, practical work, report	Test questions, blitz survey, solving practical problems, preparing a report, defending a presentation, writing an essay
LO2	Apply the rules and methods of mathematics and natural sciences to solve professional tasks in the field of information systems and technologies.	Control tasks, simulation model development, presentation, testing	System analysis, simulation modeling methods, mathematical modeling methods, geometric transformation method, test tasks
LO3	Develop neural network models to solve specified tasks, applying the basic concepts and components of neural networks, and manage the processes of creating and using information services.	Presentation, testing, project activity, modeling, discussion	Test tasks, interactive project preparation, model building, lecture, demonstration method, practical

			teaching method, group work.
LO4	Apply modern information security methods to ensure organizational system security and information security within an enterprise.	Presentation, research work, creative work, independent work, control work, case task	Interactive lecture, test tasks, demonstration method, practical teaching method, group work, solving practical tasks and cases.
LO5	Apply modern algorithms, methods, and technologies in the design and development of software, including artificial intelligence and expert systems, and participate in organizing and managing their development processes.	Testing, control work, software product/project, practical tasks, case task	Test tasks, interactive lecture, demonstration method, practical teaching method, group work, problem solving, analysis of specific situations.
LO6	Apply various platforms and programming languages, analysing the results of program code execution.	Software product/project, testing, written control, practical tasks, case task, computational and graphical task.	Project preparation, methods of analogy, measurement, control, visualization, analysis of specific situations, solving practical problems
LO7	Implement prototypes of intelligent systems based on existing artificial intelligence models using programming languages.	Calculation and graphical task, testing, software product/ project, practical work, case task	Project preparation, test questions, interactive lecture, demonstration method, practical teaching method, problem solving, group work
LO8	Implement development processes, requirements specification, and fundamental principles of software engineering by using modern programming languages and deploying scalable applications based on modern libraries and frameworks.	Testing, calculation and graphical task, software product/project.	The use of virtual application programs for the design and calculation of systems.
LO9	Apply modern methods of design and modelling of software applications and information systems.	Calculation and graphical task, testing, software product/project, practical work	Interactive lecture, project preparation, demonstration method, practical teaching method, tests, group work
LO10	Analyse large volumes of data based on scientific research for event forecasting and managerial decision-making using artificial intelligence.	Calculation and graphical task, testing, software product/project, practical work	Using virtual application programs for system design and calculation, project preparation, problem solving, test questions
LO11	Analyse economic indicators, proposing effective strategies for solving enterprises' economic problems, using basic methods of analysis and evaluation with the application of software tools.	Assignment, discussion, test, presentation, essay.	Interactive lecture, brainstorming, completing control tasks, defending a presentation, writing an essay

9 Correlation of learning outcomes of the educational program with the labor functions of professional standards (if any)

Name of the professional standards used	Professions at level 6 of the SQF	Labor functions	Tasks	Learning outcomes for the educational program
Development of Artificial Intelligence Applications	Artificial Intelligence Specialist	LF1. Management of Development Processes in an Expert System		LO 5
	Application Programmer	LF2. Development and Software Implementation of an Artificial Intelligence System		LO 7
	Artificial Intelligence Engineer	LF3. Implementation of Artificial Intelligence Systems		
System and network administration	Information Security Engineer	LF1. Ens uring the organization's system security		LO 4
Development of Systems for Processing and Storing Big Data	Neural Network Specialist	LF1. Application of Neural Networks for Data Processing Tasks	Task 1: Development of the system structure and on-screen interface forms.	LO 3
			Task 2: Implementation of an artificial intelligence system and its debugging.	

10 Graduate model

<table>
<tr><td colspan="4">GRADUATE MODEL</td></tr>
<tr><td rowspan="4">Professional Standards Development of Artificial Intelligence Applications; Professional Specialists in Information Infrastructure and IT Security; Development of Big Data Processing and torage Systems; Artificial Neural Network Designer. Sectoral Atlas and Regional Atlas of Professions and Competencies: Artificial Neural Network Designer; Data Specialist. artificial intelligence applications. System and network administration. Software development.</td><td colspan="3">Competencies (soft skills, digital skills)</td></tr>
<tr><td>Attributes of a graduate</td><td>Knowledge</td><td>Skills</td></tr>
<tr><td>- Deep knowledge in the field of AI
- Programming skills
- Analytical thinking
- Experience working with big data and computing systems
- Knowledge of ethical and legal aspects of AI</td><td>- Technologies of interpersonal and group communication in business interaction.
- The design and functioning of modern intelligent systems.
- Functional specification formalization languages
- Methods and techniques of algorithmization of assigned tasks
- Algorithms for solving typical problems, areas and methods of their application.
- Methods of managerial decision-making.
- Principles of building the architecture of artificial intelligence systems
- Methodologies and tools for designing artificial intelligence systems
- Methods and tools for designing knowledge bases
- Interface design methods and tools</td><td>- To form the customer's requirements for artificial intelligence systems
- Develop, coordinate and approve the terms of reference for the creation of artificial intelligence systems
- Develop documentation for the artificial intelligence system and its parts.
- Prepare analytical reports - Modeling of fuzzy sets, fuzzy logic
- Develop prototypes of expert systems
- Develop a hierarchical management system for expert systems
- To develop generalized and detailed algorithms that implement a mathematical model on the developed data structures</td></tr>
<tr><td colspan="3">Professional skills (hard skills)</td></tr>
<tr><td colspan="3">- Apply regulatory and technical documents (standards and regulations) on the process of developing the architecture of an intelligent system
- Apply interface design methods and tools
- Apply the principles of building the architecture of artificial intelligence systems and types of architectures of artificial intelligence systems
- Apply methodologies and tools for designing artificial intelligence systems
- Use methods and techniques of algorithmization of assigned tasks
- Develop menu structures, on-screen forms, and controls on on-screen forms.
- Develop graphic design of user interfaces</td></tr>
</table>

ТИПТІК ОҚУ ЖОСПАРЫ/ТИПИЧНЫЙ УЧЕБНЫЙ ПЛАН/TYPICAL CURRICULUM

6B06155 Жасанды интеллект 6B06155 Искусственный интеллект 6B06155 Artificial Intelligence

Модульдің № / № модуля / Module №	Пәндердің № / № дисциплины / Discipline №	ОҚУ ПӘНДЕРІНІҢ АТАУЫ НАИМЕНОВАНИЕ УЧЕБНЫХ ДИСЦИПЛИН NAME OF TEACHING DISCIPLINES	Оқу пәндерінің циклы (міндетті компонент / таңдау компоненті) Цикл учебных дисциплин (обязательный компонент / компонент по выбору) Educational disciplines cycle (compulsory component / component of choice)	Оқу пәндерінің коды Код учебной дисциплины Educational discipline code	Семестр / semester	Кредиттер саны Количество кредитов Number of credits	Курстық жұмыс (жоба) Курсовая работа (проект) Course work (project)	Білім алушылардың жұмыс уақытының бюджеті сағатпен							Семестр бойынша бөлу						Оқыту тілі (үш тілде білім беру бағдарламасы бойынша: оқыту тілінде, екінші тілде, ағылшын тілінде) / Язык обучения (для программы трехязычного образования: на языке обучения, на втором языке, на английском языке) / Language of education (for trilingual education programs: in the language learning in the second language, in English)
								Барлық сағат / Всего часов / Total hours	Аудиториялық жұмыс / Барлық аудит. сағат Всего аудит. часов Total classroom hours	оның ішінде / в том числе / including Д / ЛК / Lec	оның ішінде / в том числе / including СЗЗ / СПЗ / SPL	оның ішінде / в том числе / including ЛС / ЛЗ / LC	ОБӨЖ / СРОП / IWST	БАӨЖ / СРО / IWS	1 КУРС / 1 Академиялық кезең / Academic period	1 КУРС / 2 Академиялық кезең / Academic period	2 КУРС / 3 Академиялық кезең / Academic period	2 КУРС / 4 Академиялық кезең / Academic period	3 КУРС / 5 Академиялық кезең / Academic period	3 КУРС / 6 Академиялық кезең / Academic period	
															Семестрдағы апталар саны / Недель в семестре /		Семестрдағы апталар саны / Недель в семестре /		Семестрдағы апталар саны / Недель в семестре / Weeks in a semester		
															15	15	15	15	15	15	
															апталық аудиториялық сағат /		апталық аудиториялық сағат /		апталық аудиториялық сағат /		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Экономикалық-құқықтық, ғылыми және экологиялық білім модулі / Модуль экономико-правовых, научных и экологических знаний / Module of economic, legal, scientific and environmental knowledge																					
Модуль / Module № 1	1	Экономика, кәсіпкерлік, құқық және қаржылық сауаттылық модулі (экономика және кәсіпкерліктің негіздері, құқық негіздері және сыбайлас жемқорлыққа қарсы мәдениет, қаржылық сауаттылық негіздері) Модуль экономики, предпринимательства, права и финансовой грамотности (основы экономики и предпринимательства, основы права и антикоррупционная культура, основы финансовой грамотности) Module of Economics, Entrepreneurship, Law and Financial Literacy (Fundamentals of Economics and Entrepreneurship, Fundamentals of Law and Anti-corruption Culture, Fundamentals of Financial Literacy)	ЖБП (ЖК) ООД (ВК) GED (EC)	MEPPFG 1101-26 MEPPFG 1101-26 MEPPFG 1101-26	2-қосымша академиялық кезең Дополнительный академический период 2 Additional term 2	5		150	45	30	15		90	15							Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Тұрақты даму, экология және тіршілік қауіпсіздігі Устойчивое развитие, экология и безопасность жизнедеятельности Sustainable Development, Ecology and Life Safety	БП (ЖК) БД (ВК) BD (EC)	UREBZh 1206-26 UREBZh 1206-26 UREBZh 1206-26	1	5		150	45	15	30		15	90	1 + 2 + 0						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	3	Ғылыми зерттеулердің негіздері Основы научных исследований Fundamentals of Scientific Research	БеП (ЖК) ПД (ВК) PD (EC)	ONI 3301-26 ONI 3301-26 ONI 3301-26	5	5		150	45	15	30		15	90					1 + 2 + 0		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
Барлығы модуль бойынша / Итого по модулю / Total for module						**15**		**450**	**135**	**60**	**75**	**0**	**120**	**195**							
Ақпараттық-коммуникациялық модул / Информационно-коммуникационный модуль / Information and communication module																					
Модуль / Module № 2	1	Шетел тілі Иностранный язык Foreign Language	ЖБП (МК) ООД (ОК) GED (CS)	IYa 1104-26 (1) IYa 1104-26 (1) IYa 1104-26 (1)	1	5		150	45		45		15	90	0 + 3 + 0						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Қазақ (Орыс) тілі Казахский (Русский) язык Kazakh (Russian) Language	ЖБП (МК) ООД (ОК) GED (CS)	K(R)Ya 1105-26 (1) K(R)Ya 1105-26 (1) K(R)Ya 1105-26 (1)	1	5		150	45		45		15	90	0 + 3 + 0						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	3	Ақпараттық-коммуникациялық технологиялар Информационно-коммуникационные технологии Information and Communication Technologies	ЖБП (МК) ООД (ОК) GED (CS)	IKT 1106-26 IKT 1106-26 IKT 1106-26	1	5		150	45	15		30	15	90	1 + 0 + 2						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	4	Шетел тілі Иностранный язык Foreign Language	ЖБП (МК) ООД (ОК) GED (CS)	IYa 1104-26 (2) IYa 1104-26 (2) IYa 1104-26 (2)	2	5		150	45		45		15	90		0 + 3 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	5	Қазақ (Орыс) тілі Казахский (Русский) язык Kazakh (Russian) Language	ЖБП (МК) ООД (ОК) GED (CS)	K(R)Ya 1105-26 (2) K(R)Ya 1105-26 (2) K(R)Ya 1105-26 (2)	2	5		150	45		45		15	90		0 + 3 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
Барлығы модуль бойынша / Итого по модулю / Total for module						**25**		**750**	**225**	**15**	**180**	**30**	**75**	**450**							
Адам және қоғам дүниетанымдық және әлеуметтік-саяси білімнің негіздері / Человек и общество основы мировоззренческих и социально-политических знаний / Man and society are the foundations of ideological and socio-political knowledge																					
Модуль / Module № 3	1	Дене шынықтыру Физическая культура Physical Culture	ЖБП (МК) ООД (ОК) GED (CS)	PhK 1107-26 (1) PhK 1107-26 (1) PhK 1107-26 (1)	1	2		60	30		30			30	0 + 2 + 0						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Қазақстан тарихы История Казахстана History of Kazakhstan	ЖБП (МК) ООД (ОК) GED (CS)	IK 1101-26 IK 1101-26 IK 1101-26	2	5		150	45	30	15		15	90		2 + 1 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	3	Дене шынықтыру Физическая культура Physical Culture	ЖБП (МК) ООД (ОК) GED (CS)	PhK 1107-26 (2) PhK 1107-26 (2) PhK 1107-26 (2)	2	2		60	30		30			30		0 + 2 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	4	Дене шынықтыру Физическая культура Physical Culture	ЖБП (МК) ООД (ОК) GED (CS)	PhK 1107-26 (3) PhK 1107-26 (3) PhK 1107-26 (3)	3	2		60	30		30			30			0 + 2 + 0				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	5	Философия Философия Philosophy	ЖБП (МК) ООД (ОК) GED (CS)	Fil 2102-26 Fil 2102-26 Fil 2102-26	4	5		150	45	30	15		15	90				2 + 1 + 0			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	6	Дене шынықтыру Физическая культура Physical Culture	ЖБП (МК) ООД (ОК) GED (CS)	PhK 1107-26 (4) PhK 1107-26 (4) PhK 1107-26 (4)	4	2		60	30		30			30				0 + 2 + 0			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	7	Әлеуметтік-саясаттану білім модулі (әлеуметтану, саясаттану, мәдениеттану, психология) Модуль социально-политических знаний (политология, социология, культурология, психология) Module of Socio-Political Knowledge (Political Science, Sociology, Cultural Studies, Psychology)	БП (МК) БД (ОК) BD (CS)	MSPZ 2103-26 MSPZ 2103-26 MSPZ 2103-26	4	8		240	120	60	60		24	96				4 + 4 + 0			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
Барлығы модуль бойынша / Итого по модулю / Total for module						**26**		**780**	**330**	**120**	**210**	**0**	**54**	**396**							
Математика / Математика / Mathematics																					
	1	Сызықтық алгебра Линейная алгебра Linear Algebra	БП (ЖК) БД (ВК) BD (EC)	LA 1204-26 LA 1204-26 LA 1204-26	1	5		150	45	15	30		15	90	1 + 2 + 0						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option

Модуль / Module № 4	2	AI-шешім қабылдау тәсілдері AI-подходы к принятию решения AI-Decision-Making Approaches	БП (ТК) БД (КВ) BD (UC)	AIPPR 1202-26 AIPPR 1202-26 AIPPR 1202-26	1	4		120	45	15		30	3	72	1 + 0 + 2						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	3	Шешім қабылдау теориясы Теория принятия решений Theory of Decision-Making		TPR 1202-26 TPR 1202-26 TPR 1202-26																	
	4	Ықтималдықтар теориясы және математикалық статистика Теория вероятностей и математическая статистика Probability Theory and Mathematical Statistics	БП (ТК) БД (КВ) BD (UC)	TVMC 1201-26 TVMC 1201-26 TVMC 1201-26	1	4		120	45	15	30		3	72	1 + 2 + 0						Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	5	Сандық әдістер Численные методы Numerical Methods		ChM 1201-26 ChM 1201-26 ChM 1201-26																	
	6	Математикалық талдау Математический анализ Mathematical Analysis	БП (ЖК) БД (ВК) BD (EC)	MA 1203-26 MA 1203-26 MA 1203-26	2	4		120	45	15	30		3	72		1 + 2 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
Барлығы модуль бойынша / Итого по модулю / Total for module						**17**		**510**	**180**	**60**	**90**	**30**	**24**	**306**							
Модуль / Module № 5		**Алгоритмдеу және бағдарламалау тілдері / Алгоритмизация и языки программирования / Algorithmization and programming languages**																			
	1	Алгоритмдер, мәліметтер құрылымы және бағдарламалау (СИ) Алгоритмы, структуры данных и программирование (СИ) Algorithms, Data Structures, and Programming (C)	БП (ЖК) БД (ВК) BD (EC)	ASDiP 1201-26 ASDiP 1201-26 ASDiP 1201-26	2	5		150	45	15	30		15	90		1 + 2 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Мамандыкпен таныстыру Введение в специальность Introduction to the Specialty	БП (ЖК) БД (ВК) BD (EC)	VS(AI) 1202-26 VS(AI) 1202-26 VS(AI) 1202-26	2	3		90	30	15	15		6	54		1 + 1 + 0					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	3	Бағдарламалаудың заманауи әдістері мен құралдары Современные методы и средства программирования Modern Programming Methods and Tools	БП (ТК) БД (КВ) BD (UC)	SMiSP OP 1203-26 SMiSP OP 1203-26 SMiSP OP 1203-26	2	6		180	60	15	15	30	12	108		1 + 1 + 2					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	4	Python тілінде бағдарламалаудың негіздері Основы программирование на языке Python Basics of Programming in Python		OPYAP 1203-26 OPYAP 1203-26 OPYAP 1203-26																	
	5	Web бағдарламалау Web программирование Web Programming	БП (ТК) БД (КВ) BD (UC)	WP 2211 -26 WP 2211 -26 WP 2211 -26	4	5		150	45	15	30		15	90			1 + 2 + 0				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	6	Визуалды бағдарламалау Визуальное программирование Visual Programming		BP 2211 -26 BP 2211 -26 BP 2211 -26																	
	7	Желілік әкімшілендіру Сетевое администрирование Network Administration	БП (ТК) БД (КВ) BD (UC)	SA 2206-26 SA 2206-26 SA 2206-26	4	5		150	45	15	30		15	90			1 + 2 + 0				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	8	Объектіге бағытталған бағдарламалау (Java) Объектно-ориентированное программирование (Java) Object-Oriented Programming (Java)		OOP2206-26 OOP2206-26 OOP2206-26																	
	9	Кәсіпорын экономикасы (Minor) Экономика предприятия (Minor) Enterprise Economics (Minor)	БП (ТК) БД (КВ) BD (UC)	EP 3205-26 EP 3205-26 EP 3205-26	5	5		150	45	15	30		15	90					1 + 2 + 0		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	10	Кросс-платформалық бағдарламалау Кросс-платформенное программирование Cross-Platform Programming		KPP 3205-26 KPP 3205-26 KPP 3205-26																	
	11	Өндірістік практика 1 Производственная практика 1 Production practice 1	БеП (ЖК) ПД (ВК) PD (EC)	PP1-26(AI) PP1-26(AI) PP1-26(AI)	2	5		150	0							5 апта / недель / weeks					Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
Барлығы модуль бойынша / Итого по модулю / Total for module						**34**		**1020**	**270**	**90**	**150**	**30**	**78**	**522**							
Модуль / Module № 6		**Жасанды интеллект және деректерді өндіру / Искусственный интеллект и интеллектуальный анализ данных / Artificial intelligence and data mining**																			
	1	Жасанды интеллект жүйелері Системы искусственного интеллекта Artificial Intelligence Systems	БП (ЖК) БД (ВК) BD (EC)	SII 2205-26 SII 2205-26 SII 2205-26	4	5		150	45	15		30	15	90			1 + 0 + 2				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Табиғи тілдерді өңдеу Обработка естественных языков Natural Language Processing	БП (ТК) БД (КВ) BD (UC)	OEYa 3310-26 OEYa 3310-26 OEYa 3310-26	6	5		150	45	15	30		15	90						1 + 2 + 0	Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	3	Объектілерді басқарудағы жасанды интеллект Искусственный интеллект в управлении объектами Artificial Intelligence in the Management of Object		IIUO 3310-26 IIUO 3310-26 IIUO 3310-26																	
	4	Жасанды интеллект элементтерін аппараттық-бағдарламалық іске асыру Аппаратно-программная реализация элементов искусственного интеллекта Hardware and Software Implementation of Artificial Intelligence Elements	БеП (ТК) ПД (КВ) PD (UC)	APREII 2307-26 APREII 2307-26 APREII 2307-26	3	5		150	45	15		30	15	90				1 + 0 + 2			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	5	Болжаудың заманауи статистикалық әдістері Современные статистические методы прогнозирования Modern Statistical Methods of Forecasting		SSMP 2307-26 SSMP 2307-26 SSMP 2307-26																	
	6	Интеллектуалды басқару жүйелері Интеллектуальные системы управления Intelligent Control Systems	БеП (ТК) ПД (КВ) PD (UC)	ISU 2309-26 ISU 2309-26 ISU 2309-26	3	5		150	45	15		30	15	90				1 + 0 + 2			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	7	Үлкен деректерді өңдеу (Big Data) Обработка больших данных (Big data) Big Data Processing (Big data)		OBD BD 2309-26 OBD BD 2309-26 OBD BD 2309-26																	
	8	Өндірістік практика 2 Производственная практика 2 Production practice 2	БеП (ЖК) ПД (ВК) PD (EC)	PP2-26(AI) PP2-26(AI) PP2-26(AI)	4	5		150	0								5 апта / недель / weeks				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option

	9	Жасанды интеллект жүйелеріндегі кескіндерді өңдеу Обработка изображений в системах искусственного интеллекта Image Processing In Artificial Intelligence Systems	БеП (ТК) ПД (КВ) PD (UC)	OISII 3305-26 OISII 3305-26 OISII 3305-26	5	5		150	45	15		30	15	90					1 + 0 + 2		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	10	Экономикалық талдау (Minor) Экономический анализ (Minor) Economic Analysis (Minor)		EA-3304-26 EA-3304-26 EA-3304-26																
	11	Жасанды интеллектің математикалық модельдері Математические модели искусственного интеллекта Mathematical Models of Artificial Intelligence	БеП (ТК) ПД (КВ) PD (UC)	MMII 3306-26 MMII 3306-26 MMII 3306-26	5	5		150	45	15		30	15	90					1 + 0 + 2		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	12	Терең Машиналық оқыту Глубокое машинное обучение Deep Machine Learning		GMO 3306-26 GMO 3306-26 GMO 3306-26																
	13	Әлеуметтік медианы талдау және деректерді визуализациялау Анализ социальных сетей и визуализация данных Social Media Analysis and Data Visualization	БеП (ТК) ПД (КВ) PD (UC)	ASSiVD 3308-26 ASSiVD 3308-26 ASSiVD 3308-26	5	5		150	45	15		30	15	90					1 + 0 + 2		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	14	Жасанды интеллект және когнитивті жүйелер Искусственный интеллект и когнитивные системы Artificial Intelligence and Cognitive Systems		IIiKS 3308-26 IIiKS 3308-26 IIiKS 3308-26																
Барлығы модуль бойынша / Итого по модулю / Total for module						**40**		**1200**	**315**	**105**	**30**	**180**	**105**	**630**							
Модуль / Module № 7		**Заманауи жүйелер мен технологияларды ұйымдастыру / Организация современных системы и технологии / Organization of modern systems and technologies**																		
	1	Компьютерлік деректерді өңдеу жүйелері Компьютерные системы обработки данных Computer Data Processing Systems	БП (ТК) БД (КВ) BD (UC)	KSOD 3207-26 KSOD 3207-26 KSOD 3207-26	5	5		150	45	15	30		15	90					1 + 2 + 0		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Операциялық жүйелер Операционные системы Operating Systems		OS3207-26 OS3207-26 OS3207-26																
	3	Инженерлік және компьютерлік графика Инженерная и компьютерная графика Engineering Computer Graphics	БП (ТК) БД (КВ) BD (UC)	IKG 3208-26 IKG 3208-26 IKG 3208-26	5	5		150	45	15	30		15	90					1 + 2 + 0		Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	4	Ақпараттық жүйелердің сенімділігі Надежность информационных систем Reliability of Information Systems		NIS 3208 -26 NIS 3208 -26 NIS 3208 -26																
	5	Компьютерді ұйымдастыру және жүйелік бағдарламалау Организация компьютера и системное программирование Computer Organization and System Programming	БП (ТК) БД (КВ) BD (UC)	OKiSP 3209-26 OKiSP 3209-26 OKiSP 3209-26	6	5		150	45	15	30		15	90						1 + 2 + 0	Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	6	Деректерді өндірудің заманауи құралдары мен технологиялары Современные инструменты и технологии интеллектуального анализа данных Modern Data Mining Tools and Technologies		SIiTIAD 3209-26 SIiTIAD 3209-26 SIiTIAD 3209-26																
	7	Кәсіпорындардағы экономикалық тәуекелдер (Minor) Экономические риски на предприятиях (Minor) Economic Risks at Enterprises (Minor)	БеП (ТК) ПД (КВ) PD (UC)	ERP 3307-26 ERP 3307-26 ERP 3307-26	3	6		180	60	15	15	30	15	105			1 + 1 + 2				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	8	Робототехника және IOT технологиялары Робототехника и IoT-технологии Robotics and IoT Technologies		RIoTT 2310-26 RIoTT 2310-26 RIoTT 2310-26																
Барлығы модуль бойынша / Итого по модулю / Total for module						**21**		**630**	**195**	**60**	**105**	**30**	**60**	**375**							
Модуль / Module № 8		**Нейрондық, компьютерлік желілердің архитектурасы және ақпаратты қорғау / Архитектура нейронных, компьютерных сетей и защита информации / / Architecture of neural, computer networks and information**																		
	1	Желідегі деректер мен білімді ұсыну Представление данных и знаний в сети Representation of Data and Knowledge on the Web	БП (ТК) БД (КВ) BD (UC)	PDiZS 3211-26 PDiZS 3211-26 PDiZS 3211-26	6	5		150	45	15	30		15	90						1 + 2 + 0	Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Компьютерлік желілер және бұлтты технологиялар Компьютерные сети и облачные технологии Computer Networks and Cloud Technologies		KSiOT 3211-26 KSiOT 3211-26 KSiOT 3211-26																
	3	Ақпараттық қауіпсіздік және ақпаратты қорғау Информационная безопасность и защита информации Information Security and Information Protection	БП (ТК) БД (КВ) BD (UC)	IBiZI 3212-26 IBiZI 3212-26 IBiZI 3212-26	6	5		150	45	15	30		15	90						1 + 2 + 0	Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	4	Ақпаратты қорғаудың криптографиялық әдістері Криптографические методы защиты информации Cryptographic Methods of Information Protection		KMZI 3212-26 KMZI 3212-26 KMZI 3212-26																
	5	Нейрондық желі архитектурасына кіріспе Введение в архитектуры нейронных сетей Introduction to Neural Network Architectures	БеП (ЖК) ПД (ВК) PD (EC)	VANS 2302-26 VANS 2302-26 VANS 2302-26	3	5		150	45	15	30		15	90			1 + 2 + 0				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	6	Бұлттық мәліметтер базасы Облачные базы данных Cloud Databases	БеП (ТК) ПД (КВ) PD (UC)	OBD 2311 -26 OBD 2311 -26 OBD 2311 -26	3	6		180	60	15	15	30	12	108			1 + 1 + 2				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	7	ЖИ қауіпсіздігі және этикасы Безопасность и этика ИИ AI Safety and Ethics		BiEII 2311-26 BiEII 2311-26 BiEII 2311-26																

	8	Жасанды нейрондық желілерді әзірлеу Разработка искусственных нейронных сетей Development of Artificial Neural Networks	БеП (ЖК) ПД (ВК) PD (EC)	RINS 2303-26 RINS 2303-26 RINS 2303-26	4	5		150	45	15	30		15	90				1 + 2 + 0			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	9	Диплом алдындағы практика / өндірістік практика Преддипломная практика/ Производственная практика Pre-graduate practice/ Production practice	БеП (ЖК) ПД (ВК) PD (EC)	PDP/PP 26(AI) PDP/PP 26(AI) PDP/PP 26(AI)	6	7		210	0											7 апта / недель / weeks	Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
Барлығы модуль бойынша / Итого по модулю / Total for module						**33**		**990**	**240**	**75**	**135**	**30**	**72**	**468**							
Модуль / Module № 9		**Бағдарламалық қосымшаларды бағдарламалау / Программирование программных приложений / Programming software applications**																			
	1	Тік және толықтырылған шындық технологиялары Технологии виртуальной и дополненной реальности Virtual and Augmented Reality Technologies	БеП (ТК) ПД (КВ) PD (UC)	TViDR 2302-26 TViDR 2302-26 TViDR 2302-26	3	5		150	45	15		30	15	90			1 + 0 + 2				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	2	Ақпаратты талдаудың ғылыми тәсілдері Научные подходы для анализа информации Scientific Approaches to Information Analysis		NPDAI 2302-26 NPDAI 2302-26 NPDAI 2302-26																	
	3	Болжау мәселелерін шешудегі жасанды интеллект құралдары Инструменты ИИ в решении задач прогнозирования Artificial Intelligence Tools in Solving Forecasting Problems	БеП (ТК) ПД (КВ) PD (UC)	IIRZP 2303-26 IIRZP 2303-26 IIRZP 2303-26	3	6		180	60	15	15	30	12	108			1 + 1 + 2				Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	4	Визуалды бағдарламалау және деректерді өндіру Визуальное программирование и интеллектуальный анализ данных Visual Programming and Data Mining		VPiIAD 2303-26 VPiIAD 2303-26 VPiIAD 2303-26																	
	5	Заманауи платформаларда ойын қосымшаларын әзірлеу Разработка игровых приложений на современных платформах Development of Game Applications on Modern Platforms	БеП (ТК) ПД (КВ) PD (UC)	RIPSP 3304-26 RIPSP 3304-26 RIPSP 3304-26	5	5		150	45	15		30	15	90				1 + 0 + 2			Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	6	Компьютерлік ойындар дизайнындағы ақпараттық технологиялар Информационные технологии в дизайне компьютерных игр Information Technology in the Design of Computer Games		ITDKI 3304-26 ITDKI 3304-26 ITDKI 3304-26																	
	7	Ақпараттық жүйелердің архитектурасын жобалау және әзірлеу Проектирование и разработка архитектур информационных систем Design and Development of Information System Architectures	БеП (ТК) ПД (КВ) PD (UC)	PiRAIS 3301-26 PiRAIS 3301-26 PiRAIS 3301-26	6	5		150	45	15		30	15	90						1 + 0 + 2	Білім алушының таңдауы бойынша/ По выбору обучающегося/ By student's option
	8	Мобильді қосымшаларды бағдарламалау (iOS және Android) Программирование мобильных приложений (iOS и Android) Programming of Mobile Applications (iOS and Android)		PMP 3301-26 PMP 3301-26 PMP 3301-26																	
Барлығы модуль бойынша / Итого по модулю / Total for module						**21**		**630**	**195**	**60**	**15**	**120**	**57**	**378**							
Модуль / Module № 10		**Қорытынды аттестация / Итоговая аттестация / Final assessment**																			
	1	Қорытынды аттестаттау Итоговая аттестация Final certification			2	8		240												6 апта / недель / weeks	
Барлығы модуль бойынша / Итого по модулю / Total for module						**8**		**240**	**0**	**0**	**0**	**0**	**0**	**0**							
БАРЛЫҒЫ МОДУЛЬДАР БОЙЫНША / ИТОГО ПО МОДУЛЯМ / TOTAL FOR MODULES						**240**		**7200**	**2085**	**645**	**990**	**450**	**645**	**3720**							

Expert Opinion

on the Educational Program **6B06155 Artificial Intelligence**
within the Field of Study **6B061 Information and Communication Technologies**

INNOTECH GROUP LLP
Republic of Kazakhstan, Astana

General Characteristics of the Educational Program

The educational program "6B06155 Artificial Intelligence" has been developed in accordance with the requirements of the National Qualifications Framework of the Republic of Kazakhstan, sectoral qualification requirements, and modern professional standards in the field of information and communication technologies and artificial intelligence.

The implementation of this educational program is driven by the rapid development of artificial intelligence technologies and their widespread adoption across various sectors of the economy. Modern organizations require specialists capable of developing intelligent software products, analyzing large volumes of data, creating decision support systems, and applying machine learning methods to solve practical problems. The training of professionals in the field of artificial intelligence aligns with the strategic directions of digitalization in the Republic of Kazakhstan and global trends in technological development.

The aim of the educational program is to prepare competitive specialists with modern knowledge in the fields of artificial intelligence, data analytics, software engineering, and intelligent information systems, capable of effectively performing professional activities in the digital economy.

A distinctive feature of the program is the integration of fundamental knowledge in mathematics, computer science, and programming with advanced technologies in machine learning, deep learning, computer vision, natural language processing, and data mining. The educational program is focused on developing practical skills in designing and implementing intelligent solutions that are highly demanded in today's labor market.

Description and Evaluation of the Educational Program Structure

The structure of the educational program complies with the requirements of higher education and ensures the consistent development of students' competencies through the study of general education, basic, and major-specific disciplines.

Fundamental training includes courses in mathematics and information technologies that provide the theoretical foundation for mastering artificial intelligence technologies. Students acquire knowledge in algorithms and data structures, mathematical statistics, programming, databases, computer systems, and network technologies.

The major component of the program is focused on the study of modern artificial intelligence methods, including machine learning, deep neural networks,

data mining, natural language processing, computer vision, big data technologies, cloud computing, and information security of intelligent systems.

The content of the disciplines is aligned with the professional competencies of graduates and ensures the development of skills in creating AI-based software solutions, analyzing data, and building intelligent models for solving applied problems of varying complexity.

The organization of professional internships contributes to the acquisition of practical experience in the development and implementation of intelligent technologies, working with real datasets, using specialized software platforms, and performing tasks closely related to professional practice. The content of internships corresponds to the program profile and promotes the development of both professional and research competencies among students.

General Conclusion

The educational program "6B06155 Artificial Intelligence" meets modern higher education requirements and is aimed at training specialists who are highly востребованы in the context of the digital transformation of the economy and society.

The content of the program reflects current trends in the development of artificial intelligence, takes into account employers' needs, and contributes to the formation of professional competencies necessary for successful careers in information technology, data analytics, and intelligent systems.

Considering the relevance of the educational program, its practical orientation, compliance with modern scientific and technological trends, and labor market requirements, the educational program "6B06155 Artificial Intelligence" is recommended for implementation in the educational process of K. Kulazhanov Kazakh University of Technology and Business.

Director
INNOTECH GROUP LLP
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26 Imanov Street, Apt. 413



Expert Opinion

on the Educational Program **6B06155 Artificial Intelligence**
within the Field of Study **6B061 Information and Communication Technologies**

ENERGY SYSTEMS PROJECT LLP
Republic of Kazakhstan, Astana

General Characteristics of the Educational Program

The educational program "6B06155 Artificial Intelligence" has been developed in accordance with the requirements of the National Qualifications Framework of the Republic of Kazakhstan, sectoral qualification requirements, and modern professional standards in the field of information and communication technologies and artificial intelligence.

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The aim of the educational program is to prepare competitive specialists with modern knowledge in the fields of artificial intelligence, data analytics, software engineering, and intelligent information systems, capable of effectively performing professional activities in the digital economy.

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Director
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3 Tauelsizdik Avenue

Expert Opinion

on the Educational Program **6B06155 Artificial Intelligence**
within the Field of Study **6B061 Information and Communication Technologies**

DMK construction LLP
Republic of Kazakhstan, Astana

General Characteristics of the Educational Program

The educational program "6B06155 Artificial Intelligence" has been developed in accordance with the requirements of the National Qualifications Framework of the Republic of Kazakhstan, sectoral qualification requirements, and modern professional standards in the field of information and communication technologies and artificial intelligence.

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The aim of the educational program is to prepare competitive specialists with modern knowledge in the fields of artificial intelligence, data analytics, software engineering, and intelligent information systems, capable of effectively performing professional activities in the digital economy.

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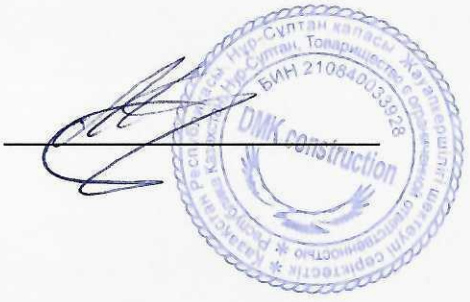
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Considering the relevance of the educational program, its practical orientation, compliance with modern scientific and technological trends, and labor market requirements, the educational program "6B06155 Artificial Intelligence" is recommended for implementation in the educational process of K. Kulazhanov Kazakh University of Technology and Business.

Production Director
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Expert Opinion

on the Educational Program **6B06155 Artificial Intelligence**
within the Field of Study **6B061 Information and Communication Technologies**

ADAL SISTEM LLP
Republic of Kazakhstan, Astana

General Characteristics of the Educational Program

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The aim of the educational program is to prepare competitive specialists with modern knowledge in the fields of artificial intelligence, data analytics, software engineering, and intelligent information systems, capable of effectively performing professional activities in the digital economy.

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Considering the relevance of the educational program, its practical orientation, compliance with modern scientific and technological trends, and labor market requirements, the educational program "6B06155 Artificial Intelligence" is recommended for implementation in the educational process of K. Kulazhanov Kazakh University of Technology and Business.

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Y. Lavrentyev
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Expert Opinion

on the Educational Program **6B06155 Artificial Intelligence**
within the Field of Study **6B061 Information and Communication Technologies**

ZHOBA LTD LLP
Republic of Kazakhstan, Astana

General Characteristics of the Educational Program

The educational program "6B06155 Artificial Intelligence" has been developed in accordance with the requirements of the National Qualifications Framework of the Republic of Kazakhstan, sectoral qualification requirements, and modern professional standards in the field of information and communication technologies and artificial intelligence.

The implementation of this educational program is driven by the rapid development of artificial intelligence technologies and their widespread adoption across various sectors of the economy. Modern organizations require specialists capable of developing intelligent software products, analyzing large volumes of data, creating decision support systems, and applying machine learning methods to solve practical problems. The training of professionals in the field of artificial intelligence aligns with the strategic directions of digitalization in the Republic of Kazakhstan and global trends in technological development.

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Considering the relevance of the educational program, its practical orientation, compliance with modern scientific and technological trends, and labor market requirements, the educational program "6B06155 Artificial Intelligence" is recommended for implementation in the educational process of K. Kulazhanov Kazakh University of Technology and Business.

Director of
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"Zhobaltd" ТОВАРИЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ
на образовательную программу 6В06155 «Искусственный интеллект» по направлению подготовки 6В061 «Информационно-коммуникационные технологии»

Общая характеристика образовательной программы

Образовательная программа 6В06155 «Искусственный интеллект» разработана в соответствии с Государственным общеобязательным стандартом высшего образования Республики Казахстан, Национальной рамкой квалификаций, требованиями соответствующих отраслевых рамок квалификаций и профессиональными стандартами «Разработка приложений искусственного интеллекта», «Системное и сетевое администрирование» и «Разработка программного обеспечения». Программа относится к области образования 6В06 «Информационно-коммуникационные технологии», направлению подготовки 6В061 «Информационно-коммуникационные технологии» и группе образовательных программ В057 «Информационные технологии». Общая трудоёмкость программы составляет 240 академических кредитов.

Актуальность образовательной программы обусловлена активным внедрением технологий искусственного интеллекта, машинного обучения, интеллектуального анализа данных и автоматизированной обработки информации в производственные, экономические, финансовые, социальные и управленческие процессы. Современный рынок труда характеризуется устойчивой потребностью в специалистах, способных разрабатывать, внедрять и сопровождать интеллектуальные системы, работать с большими массивами данных, создавать алгоритмы принятия решений и программные продукты на основе методов искусственного интеллекта.

Цель образовательной программы соответствует её содержанию и предусматривает подготовку квалифицированных специалистов, владеющих современными технологиями и методами интеллектуальной обработки и анализа данных, знаниями в области разработки программного обеспечения, машинного обучения, нейронных сетей и информационных систем.

Образовательная программа ориентирована на формирование общих, цифровых и профессиональных компетенций. Результаты обучения предусматривают освоение программирования, проектирования нейронных сетей, разработки прототипов интеллектуальных систем, анализа больших объёмов данных, моделирования программных приложений, обеспечения информационной безопасности и применения искусственного интеллекта при решении прикладных задач.

К профессионально значимым результатам обучения относятся способности:

— проектировать модели нейронных сетей и управлять процессами их создания и применения;

— использовать современные алгоритмы, языки и платформы программирования;

— разрабатывать прототипы интеллектуальных систем и программных приложений;

— анализировать большие объёмы данных и применять результаты анализа для прогнозирования и принятия решений;

— обеспечивать системную и информационную безопасность;

— применять методы искусственного интеллекта в экономических, производственных и управленческих задачах.

Практико-ориентированная направленность программы обеспечивается включением профессиональной практики, лабораторных и проектных заданий, работой с программными средствами, базами данных, алгоритмами машинного обучения и современными инструментами разработки. В разработке и согласовании программы приняли участие

представители предприятий и организаций, что подтверждает её соответствие запросам работодателей.

Дополнительная образовательная программа minor «Экономический анализ и управление» расширяет профессиональные возможности выпускников и позволяет применять технологии искусственного интеллекта при анализе экономических показателей, оценке рисков и принятии управленческих решений.

Описание и оценка структуры образовательной программы

Структура образовательной программы сформирована логично и последовательно. Она включает цикл общеобразовательных дисциплин, базовые и профилирующие дисциплины, профессиональную практику и итоговую аттестацию.

Цикл общеобразовательных дисциплин обеспечивает формирование мировоззренческих, социальных, коммуникативных, правовых и информационных компетенций обучающихся.

Базовые дисциплины направлены на формирование фундаментальной подготовки в области математики, алгоритмизации, программирования, информационно-коммуникационных технологий, архитектуры компьютерных систем, баз данных, информационной безопасности и разработки программного обеспечения.

Профилирующие дисциплины обеспечивают освоение специализированных знаний и навыков в области искусственных нейронных сетей, машинного обучения, интеллектуального анализа данных, компьютерного зрения, обработки больших данных, проектирования интеллектуальных систем и разработки прикладных программных решений.

Содержание дисциплин соответствует компетентностной модели выпускника. Между результатами обучения, дисциплинами и видами профессиональной деятельности прослеживается содержательная взаимосвязь. Обучение построено от освоения фундаментальных математических и программных основ к разработке сложных интеллектуальных систем и анализу данных.

Образовательная программа предусматривает использование современных методов обучения и оценивания: проектной деятельности, практических и лабораторных работ, анализа производственных ситуаций, разработки программных продуктов, презентации результатов, выполнения индивидуальных и групповых заданий.

Профессиональная практика соответствует заявленным видам деятельности выпускника. Её содержание направлено на закрепление навыков программирования, анализа данных, разработки и тестирования программных решений, создания моделей искусственного интеллекта и участия в проектной работе. Общий объём практической подготовки позволяет обеспечить связь теоретического обучения с профессиональной деятельностью.

Выборный компонент предоставляет обучающимся возможность формировать индивидуальную образовательную траекторию и осваивать дисциплины с учётом профессиональных интересов и перспектив трудоустройства.

Общее заключение

Образовательная программа 6B06155 «Искусственный интеллект» соответствует современному уровню развития образования, науки, информационно-коммуникационных технологий и программной инженерии.

Содержание программы ориентировано на подготовку специалистов, востребованных на национальном и региональном рынках труда. Выпускники могут осуществлять профессиональную деятельность в IT-компаниях, промышленных предприятиях, финансовых организациях, государственных учреждениях, научно-исследовательских центрах и других организациях, использующих технологии искусственного интеллекта и обработки данных.

Цель программы, результаты обучения, перечень дисциплин, виды практики и модель выпускника согласованы между собой. Образовательная программа обеспечивает

сочетание фундаментальной подготовки, профессиональных знаний и практических навыков.

Качество содержания образовательной программы оценивается положительно. Образовательная программа 6B06155 «Искусственный интеллект» может быть рекомендована к реализации в АО «Казахский университет технологии и бизнеса имени К. Кулажанова». Структура заключения подготовлена в соответствии с представленным бланком.

Рекомендации по использованию или усовершенствованию образовательной программы

Рекомендуется:

1. Ежегодно актуализировать содержание элективных дисциплин с учётом развития технологий искусственного интеллекта.
2. Продолжить привлечение работодателей к проведению практических занятий и оцениванию студенческих проектов.
3. Расширять использование реальных наборов данных и прикладных производственных задач в учебном процессе.

Эксперт:	Т. Курманбек уулу
Должность, ученая степень:	Профессор, доктор технических наук
Организация:	Кыргызский государственный университет имени И. Арабаева, Республика Кыргызстан

Дата: 24.01.2026г.

М.П. БӨЛҮМ ОТДЕЛ КАДРОВ

И. АРАБАЕВ атындагы КЫРГЫЗ МАМЛЕКЕТТИК УНИВЕРСИТЕТИ
КЫРГЫЗСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ им. И. АРАБАЕВА

КОЛ ТАМГАСЫН ТАСТЫКТАЙМЫН
ПОДПИСЬ ЗАВЕРЯЮ

International Academic Advisor Confirmation/ Шетелдік кеңесшінің қатысуы/ Участие зарубежного консультанта

Educational Program/ Білім беру бағдарламасы/ Образовательная программа	6B06155 Artificial Intelligence 6B06155 Жасанды интеллект 6B06155 Искусственный интеллект
Level/ Дәрежесі/ Уровень	Bachelor/Бакалавриат/Бакалавриат
International Academic Advisor/ Шетелдік академиялық кеңесші/ Зарубежный консультант	Biybosunov Bolotbek Ilyasovich / Бийбосунов Болотбек Ильясович
Academic degree/ Ғылыми дәреже/ Ученая степень	Prof., D.Sc. in Engineering, D.Sc. in Phys.-Math./ профессор т. ғ.д., ф.-м.ғ.д./ профессор, д.т.н., д.ф.-м.н
Position/ Лауазымы/ Должность	Head of the Department of Applied Informatics/ Қолданбалы информатика кафедрасының меңгерушісі/ зав. кафедрой прикладной информатики
University/ Университет/ Университет	KSU named after I. Arabaev/КГУ имени И.Арабаева/И.Арабаев атындағы ҚМУ
Country/ Ел/ Страна	Kyrqyzstan/Қырғызстан/Киргизстан

Approved/ Келісілді/ Согласовано

The educational program has been reviewed and approved. The updated content of the educational program, the sequence of courses, and the revised learning outcomes (LO) have been developed in accordance with modern academic approaches.

Білім беру бағдарламасы қарастырылып, келісілді. Білім беру бағдарламасының жаңартылған мазмұны, пәндерді оқу реттілігі және жаңартылған оқу нәтижелері (ОН) заманауи академиялық тәсілдерге сәйкес әзірленді.

Образовательная программа рассмотрена и согласована. Актуализированное содержание образовательной программы, последовательность изучения дисциплин и обновленные результаты обучения (РО) сформированы с учетом современных академических подходов.

International Academic Advisor/ Шетелдік академиялық кеңесші/ Зарубежный консультант	Biybosunov Bolotbek Ilyasovich / Бийбосунов Болотбек Ильясович	_____ *(Signature/ Қолы/ Подпись)*	25.04.2026 *(Date/ Күні/ Дата)*

Seal/ М.О./ М.П.

КАДРЛАР БӨЛҮМҮ / ОТДЕЛ КАДРОВ

И. АРАБАЕВ атындағы ҚЫРГЫЗ МАМЛЕКЕТТИК УНИВЕРСИТЕТ
КЫРГЫЗСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ им.И. АРАБАЕВА

КОЛ ТАМГАСЫН ТАСТЫКТАЙМЫН
ПОДПИСЬ ЗАВЕРЯЮ _____