AGREED
Chairman of the
Educational and Methodological
Council of JSC «International Information
Technology University»

_____ **Mustafina A.K.**

APPROVED
By the Chairman of the Board - Rector
of the JSC «International Information
Technology University»

_____ **Issakhov A.A.**

«12» December 2024 Protocol of the EMC № 3 «28» February 2025 Protocol of the AC № 10

EDUCATIONAL PROGRAM

6B06120 Artificial intelligence

Code and classification of the field of education: 6B06 Information and communication technologies

Code and classification of training area: 6B061 Information and communication technologies

Group of educational programs: B057 Information technologies

ISCED level: 6

NQR level: 6

ORC level: 6

Academic Degree Awarded: Bachelor in Information and Communication Technologies in the educational program “6B06120 Artificial Intelligence”

Duration of study: 3 years

Number of credits: 240

AGREED
by Director REDPRINT LLP
(Digital Agency NIDGE)

_____ M.M. Ryskeldi

«__» _____ 2025.

AGREED
Deputy Director for Research of the Institute of
Ionosphere

_____ B.A. Iskakov

«__» _____ 2025.

Almaty, 2025

The code and name of the educational program: **6B06120 Artificial intelligence**

№	**Developers of the Educational Program (Position, Academic Degree, Scientific Degree, Full Name)**	**Date**	**Signature**	**Note**
1	Associate Professor of the Department of Mathematical and Computer Modeling, PhD Ydyrys A.Zh.			
2	Associate Professor of the Department of Mathematical and Computer Modeling, PhD Omarov B.S.			
3	Associate Professor of the Department of Mathematical and Computer Modeling, PhD Nurtas M.			
4	Senior Lecturer of the Department of Mathematical and Computer Modeling, Master Olzhayev O.M.			

Contents

List of abbreviations and acronyms

BD	Cycle of basic disciplines
BC	Basic competency
BM	Basic module
UC	University component
HE	Higher education
NMS	National Mandatory Standards of Higher and Post-Graduate Education
ATT	Additional types of training
EQF	European qualifications framework
EFE	European foundation for education
KSA	Knowledge, Skills and Abilities
FA	Final attestation
EC	Elective component
ISCED	International Standard Classification of Education
NQF	National qualifications framework
NQS	National qualifications system
GHM	General humanitarian module
RC	Required component
GEM	General education module
GED	Cycle of general education disciplines
EP	Educational program
GPM	General professional module
SQF	Sectoral qualifications framework
GEC	General education competency
PD	Cycle of major disciplines
PI	Professional internship
PS	Professional standard
PE	Postgraduate education
PC	Professional competency
PM	Professional module
LO	Learning outcome
QMS	Quality Management System

1. Description of the educational program

The **"Artificial Intelligence"** educational program is aimed at training specialists with in-depth knowledge and practical skills in the development and application of intelligent systems. The program covers key areas such as machine learning, neural networks, natural language processing, computer vision, data mining, and robotics.

Students gain both theoretical foundations of AI and hands-on experience with modern tools and technologies used in real-world applications. Special attention is given to learning algorithms, modeling, building predictive systems, and applying AI across various industries — including business, healthcare, manufacturing, and education.

At the same time, the student is left with the opportunity to take additional subjects at his discretion as free electives (minors) - these can be subjects from any specialty.

Graduates of the program will be able to develop and implement intelligent solutions, analyze big data, automate processes, and contribute to the creation of innovative digital products that are in high demand in the context of digital transformation.

2. Aim and objectives of the educational program

The goal of the educational program "Artificial Intelligence" is to train highly qualified specialists with deep knowledge and skills in the field of artificial intelligence, capable of solving complex problems in various fields of activity.

The objectives of the educational program “Artificial Intelligence” are*:*

• students receive good mathematical training;
• formation of a theoretical basis in the field of artificial intelligence;
• development of practical skills in the application of machine learning methods and data analysis;
• familiarization with modern technologies in the field of computer vision and natural language processing;
• mastering methods of research and development of new algorithms and artificial intelligence models.

3. Passport of the educational program

№	Name	Description
1.	Education area code and classification	6B06 Information and communication technologies
2.	Training direction code and classification	6B061 Information and communication technologies
3.	Group of academic programs	B057 Information technology
4.	Name of the educational program	6B06120 Artificial Intelligence
5.	Aim of the educational program	The goal of the educational program "Artificial Intelligence" is to train highly qualified specialists with deep knowledge and skills in the field of artificial intelligence, capable of solving complex problems in various fields of activity.
6.	Type of the educational program	Innovative
7.	Level according to the National Classifications Framework	6
8.	Level according to the Sectoral Qualifications Framework	6
9.	Distinctive features of the program	Collaborative EP
10.	Partner University	Astana IT University
11.	Academic degree awarded	Bachelor
12.	Duration of study	3 years
13.	Volume of credits	240
14.	Language of education	english

15.	Atlas of new professions	General AI Developer Multi-experience Monitoring Specialist (User Experience) Artificial Neural Network Designer IT Ethics Consultant
16.	Regional standard	No
17.	Availability of an attachment to the training license	Yes
18.	License number for the training area	KZ81LAM00001263
19.	Availability of program accreditation	yes
20.	Generated learning outcomes	
	LO1: Apply programming languages such as Python, Java, and C++ to design and implement AI algorithms. LO2: Apply linear algebra, statistics, probability theory, and optimization methods to solve AI problems. LO3: Develop, train and test machine learning and deep learning models. LO4: Apply specialized AI technologies, such as natural language processing and computer vision, to create intelligent systems. LO5: Understand the ethical and social implications of AI, including issues of privacy, security, and algorithm bias. LO6: Organize project management, teamwork, communicate effectively and collaborate with colleagues and partners. LO7: Apply AI theories and methods to real-world projects, including internships and project activities with industrial and academic partners. LO8: Assess the relevance of your knowledge to adapt to rapidly changing technologies in the field of AI. LO9: Analyze data, develop and test hypotheses using AI tools to conduct scientific research. LO10: Conduct interdisciplinary scientific research using basic knowledge from the fields of economics and law, ecology and life safety. LO11: Apply entrepreneurial skills to problems calculating the profitability of scientific projects. LO12: Apply the acquired knowledge in the chosen additional educational program.	

4. Professional Standards (PS), profession cards, labor functions

№	Name of the PS	Profession card	Labor functions
1.	Software Development Approval year:2022 CCEA: Information and Communication	Software Designer NQF Level: 6	Software requirements analysis Detailed software design. Software programming and testing. Integration of software modules and software components. Software design
2	Development of big data processing and storage systems Approval year:2022 CCEA: Information and Communication	Machine Learning Specialist NQF Level: 6	Design and implementation of systems using machine learning
		NLP Engineer (computational linguistics specialist) NQF level: 6	Processing text information using computing tools and technology
		Computer Vision Programmer NQF Level: 6	Data preparation and development of programs for video and graphic image processing

		Neural Network Specialist NQF Level: 6	Application of neural networks in solving complex problems in data processing Preparation of data for use in neural systems
3	Development of artificial intelligence applications Approval year:2022 CCEA: Information and Communication	Application Programmer NQF Level: 6	Development and Software Implementation of an Artificial Intelligence System Design of an Artificial Intelligence System
		AI Engineer NQF Level: 6	Implementation of AI
		Systems AI Specialist NQF Level: 6	Design of Expert Systems

5. List of the EP competencies

List of the general educational competencies

GEC1: Know: social and ethical values based on public opinion, traditions, customs, social norms and focus on them in your professional activities; traditions and culture of the peoples of Kazakhstan; human and civil rights and freedoms; fundamentals of the legal system and legislation of Kazakhstan; trends in social development of society; basics of physical culture and principles of a healthy lifestyle.
GEC 2: Have an idea of: ethical and spiritual values; about sociological approaches to personality, basic patterns and forms of regulation of social behavior; about the essence of power and political life, political relations and processes, the role of political systems in the life of society and various social groups; about the role of consciousness and self-awareness in the behavior, communication and activities of people, the formation and development of personality.
GEC 3: Own: ethical and legal standards of behavior; a system of practical knowledge and skills that ensure the acquisition, development, improvement and activation of psychophysical abilities and qualities, the acquisition, preservation and promotion of health, the ability to work in a team, correctly defend one's point of view, and propose new solutions.
GEC4: Ability for written and oral communication in the state language and the language of interethnic communication; the ability to construct oral and written speech in a logical, reasoned and clear manner; readiness to use one of the foreign languages.
GEC 5: Ability to use modern information technologies, manage information using business applications; use network computer technologies, databases and application packages in your subject area.
GEC6: Know: the basics of economic theory, the basics of financial literacy, ecology and life safety, research methods; have an understanding of business activities.

List of the basic competencies

BC1: The ability to actually use the state language, the language of interethnic communication and a foreign language in professional activities.
BC2: The ability to understand the basics of economic knowledge, scientific ideas about finance, economics, and ethics of AI.
BC3: Ability to program in languages used in the development of artificial intelligence.
BC4: Understanding of basic machine learning and deep learning algorithms.
BC5: The ability to use basic concepts and methods to solve problems, the ability to carry out design documentation in a computer graphics software environment for various types of projects.
BC6: The ability to be competent in choosing mathematical modeling methods to solve specific problems, including the willingness to identify the natural scientific essence of problems arising in the process of professional activity, and the ability to use the appropriate physical and mathematical apparatus to solve it.
BC7: Ability to develop information and software for an information system based on modern methods and development tools.

BC8: Ability to find limits; differentiate and integrate basic elementary functions; explore functions using differential calculus methods; apply methods of differential and integral calculus when solving applied problems; be able to classify differential equations and apply the necessary methods to solve these equations; solve linear differential equations of the nth order and systems of linear equations with constant coefficients; be able to work with matrices.

List of the professional competencies

PC1: Development and implementation of machine learning algorithms and models for various tasks;
PC2: Optimizing and improving the performance of machine learning models;
PC3: Working with large volumes of data and optimizing data processing processes;
PC4: Ability to apply knowledge to project management;
PC5: Development and implementation of algorithms and models for solving specific problems related to artificial intelligence, for example, pattern recognition, natural language processing or anomaly detection, etc.;
PC6: Ability to apply acquired knowledge in the selected additional educational program.

6. List of learning outcomes of the EP

LO1: Apply programming languages such as Python, Java, and C++ to design and implement AI algorithms.
LO2: Apply linear algebra, statistics, probability theory, and optimization methods to solve AI problems.
LO3: Develop, train and test machine learning and deep learning models.
LO4: Apply specialized AI technologies, such as natural language processing and computer vision, to create intelligent systems.
LO5: Understand the ethical and social implications of AI, including issues of privacy, security, and algorithm bias.
LO6: Organize project management, teamwork, communicate effectively and collaborate with colleagues and partners.
LO7: Apply AI theories and methods to real-world projects, including internships and project activities with industrial and academic partners.
LO8: Assess the relevance of your knowledge to adapt to rapidly changing technologies in the field of AI.
LO9: Analyze data, develop and test hypotheses using AI tools to conduct scientific research.
LO10: Conduct interdisciplinary scientific research using basic knowledge from the fields of economics and law, ecology and life safety.
LO11: Apply entrepreneurial skills to problems calculating the profitability of scientific projects.
LO12: Apply the acquired knowledge in the chosen additional educational program.

7. Matrix for correlating the learning outcomes of the EP with the formed competencies (V)

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12
BC1						V						
BC2					V			V				V
BC3	V							V				
BC4			V									
BC5						V						
BC6		V							V			
BC7	V			V								V
BC8		V										
PC1			V					V				
PC2			V									
PC3							V	V	V			
PC4						V		V				
PC5				V				V				

PC6										**V**	**V**	**V**

8. The relationship of LO with labor functions

№	LO	Labor functions
1.	LO1	Software programming and testing Software design Integration of software modules and software components Design and implementation of systems using machine learning
2.	LO2	Design of artificial intelligence systems Design and implementation of systems using machine learning Preparation of data and development of programs for processing video and graphic images Application of neural networks in solving complex problems in data processing
3.	LO3	Development and software implementation of an artificial intelligence system Design and implementation of systems using machine learning Application of neural networks in solving complex problems in data processing
4.	LO4	Processing text information using computing tools and technology Preparing data and developing programs for processing video and graphic images
5.	LO5	Software Requirements Analysis Preparation of data for use in neural systems
6.	LO6	Software design Detailed software design.
7.	LO7	Development and software implementation of an artificial intelligence system Design and implementation of systems using machine learning Design of an artificial intelligence system Implementation of artificial intelligence systems
8.	LO8	Software Requirements Analysis Design and Implementation of Systems Using Machine Learning
9.	LO9	Design and implementation of systems using machine learning Application of neural networks in solving complex problems in data processing Preparation of data for use in neural systems
10.	LO10	Expert Systems Design
11.	LO11	Software Requirements Analysis
12.	LO12	Software Design Software Requirements Analysis

9. Table showing interconnection of competencies, learning outcomes, assessment methods and criteria

Competencies of an EP graduate	Competencies expressed in expected learning outcomes	Evaluation criteria	Name of assessment method
General educational competencies			
GEC1 GEC2 GEC3 GEC6	LO10 LO11	Knows the basic concepts in the field of study	Summary
		Reproduces and explains basic concepts in the area under study	Report, message
		Knows the basic concepts in the field of study	Test
GEC5	LO1	Uses knowledge in the area under study in practice	Project
		Solve complex problems based on acquired knowledge	Multi-level tasks and assignments

GEC4	LO6	Able to construct oral speech in a reasoned and clear manner	Round table, discussion, controversy, dispute, debate
		Able to construct oral speech logically and clearly	Interview
		Able to construct written speech logically and clearly	Essay
Basic competencies			
BC2 BC4	LO3	Knows the basic concepts of the area under study	Case study
	LO5	Knows the basic concepts of the area under study	Test
	LO8	Knows the basic concepts of the area under study	Case study
BC3 BC5 BC6 BC7 BC8	LO1	Applies acquired knowledge to solve practical problems	Project
	LO2	Solve complex problems based on acquired knowledge	Multi-level tasks and assignments
	LO4	Applies acquired knowledge to solve practical problems	Project
	LO6	Applies acquired knowledge to solve practical problems	Calculation and graphic work
	LO8	Applies acquired knowledge to solve practical problems	Case study
	LO9	Applies acquired knowledge to solve practical problems	Project
BC1	LO6	Able to present his ideas in a compelling manner	Colloquium
Professional competencies			
PC1 PC4 PC5	LO3	Applies acquired knowledge to solve practical problems	Project
	LO4	Applies acquired knowledge to solve practical problems	Project
	LO6	Applies acquired knowledge to solve practical problems	Calculation and graphic work
	LO8	Applies acquired knowledge to solve practical problems	Case study
PC2 PC3	LO3	Able to formulate conclusions when solving practical problems	Laboratory work
	LO7	Able to retrieve necessary information	Colloquium
	LO8	Able to formulate conclusions when solving practical problems	Laboratory work
	LO9	Able to formulate conclusions when solving practical problems	Laboratory work
PC6	LO10 LO11 LO12	Able to apply acquired knowledge in the chosen additional educational program	Project

10. Information about the modules of the educational program

Module code and module name	Module volume (work intensity)	Learning outcomes	Criteria for assessing learning outcomes	Disciplines forming the module Code and Name
GENERAL EDUCATION MODULES				
OOM6001 Module of social and cultural development	18	Has an understanding of the principles and patterns of historical development of society, the historical periodization of Kazakhstan's history, the place of Kazakhstan's history in world history and the history of Eurasia. Is capable of independently conducting comprehensive and critical analysis of historical and contemporary sources, drawing conclusions and supporting them with arguments.	Oral interview, testing, report, midterm and endterm, semester papers	History of Kazakhstan
		Has an understanding of the subject, functions, main branches, and directions of philosophy; the place and role of philosophy in society and human life; the main stages of development of world and Kazakh philosophical thought. Is able to use specialized philosophical terminology and the conceptual-categorical apparatus of philosophy; - creatively and critically work with original philosophical texts; - logically express their thoughts on studied philosophical issues; - analyze the features of the genesis and development of philosophical knowledge; formulate and argue their own worldview positions.	Oral interview, testing, report, midterm and endterm, semester papers	Philosophy
		Has an understanding of the subject, functions, main branches, and directions of sociology; is familiar with key approaches in the sociology of organizations both at the level of theoretical concepts and models, as well as at the level of empirical research; and is acquainted with basic methods and techniques of organizational research. Is capable of: - navigating various sociological approaches to the analysis of organizations and the literature related to each approach; - acquiring skills in critical analysis of these approaches (understanding their advantages and limitations); - obtaining basic analytical skills in sociological research of organizations; having an understanding of key methods of organizational research and their limitations. Has an understanding of the subject, functions, and main branches of political science; should grasp the fundamental concepts of politics and political science, the development of major political theories and concepts, and assimilate the	Oral interview, testing, report, midterm and endterm, semester papers	Sociology-Political science

		contributions made by various thinkers to the conceptual understanding of key issues in politics, society, the state, and power. Is capable of understanding the basics of scientific political analysis at both theoretical and applied levels, as well as the potential of political analysis and forecasting methods for making optimal managerial decisions. Applies theoretical knowledge in real political practice at the levels of analysis, expertise, consulting, and management.		
		Has an understanding of the subject, functions, main branches, and directions of psychology; the place and role of psychology in the life of society and the individual. Is capable of forming fundamental knowledge, skills, and competencies necessary for professional activity; — fostering ecological, physical, ethical, legal culture, and culture of thinking; — language training; — fostering universal human and socio-personal values. Has an understanding of the subject as logically complete elements of the discipline's content, providing a basis for defining the course topics and the material to be assessed. The structuring of this educational content is also a necessary condition for the functioning of the rating system. Furthermore, such structuring helps students form a general understanding of the development of world culture and to systematize their knowledge. Is capable of giving students an understanding of the main problems of cultural theory; identifying objective patterns in global and national cultural processes; clarifying the genesis, functioning, and development of culture as a specifically human way of life, which historically reveals itself as a process of cultural heritage; considering cultural aspects of various spheres of social life; identifying the features of cultural life in different world regions, historical epochs, and cultural-historical types.	Oral interview, testing, report, midterm and endterm, semester papers	Cultural studies-Psychology
OOM6002 Language and ICT skills development module	25	Is capable of describing – the basic rules of reading; word-formation models; contextual meanings of polysemous words; terms and lexical constructions of the sublanguage corresponding to the profile of the studied specialty; the most frequent specific grammatical phenomena. Understands statements in a foreign language, features of the compositional and semantic organization of a scientific text; the main techniques for extracting the key information from a microtext.	Oral interview, testing, report, midterm and endterm, semester papers	Foreign language
		Identify linguistic forms expressing various types of information in scientific texts to solve tasks of academic and professional communication; principles of composing texts in main academic-scientific and scientific-professional genres.		Kazakh (Russian) language

		Knows: - The main directions of ICT development; - The basics of using information resources for information search and storage; - The architecture and components of computer systems; - The main goals and tasks of information security. Can: - Work in any operating system and with databases; - Apply methods and tools for information protection; - Work with spreadsheets, consolidate data, and build charts. Has skills in: - Processing vector and raster images; - Creating multimedia presentations; - Data visualization; - Using various forms of e-learning to expand professional knowledge; Working with cloud services and e-technologies.	Oral interview, testing, report, midterm and endterm, calculation and graphic works	Information and Communication Technologies
OOM6003 Module of physical culture	8	Knows the main tasks of physical education of students, Can pass control exercises and standards.	Test	Physical Culture
OOM6004 Module of personal and social development	30	Have an understanding of the principles and patterns of economic relations. To be familiar with basic financial terms such as income, expenditure, assets, liabilities, capital and current expenditures, investments, loans, and savings.	Oral interview, testing, report, midterm and endterm, semester papers	Foundation of economics and financial literacy
		Have the ability for independent theoretical and practical judgments and conclusions. Be able to objectively evaluate scientific information, the freedom of scientific inquiry, and the aspiration to apply scientific knowledge in educational activities, including for completing a diploma project (work).		Research metodology
		Have an understanding of the principles of law and anti-corruption culture.		Fundamentals of law and anti-corruption culture
		Knows the fundamentals of ensuring personal and public safety in emergency situations. Can apply methods of prevention and protection against hazardous and harmful factors in everyday and professional activities.		Fundamentals safety of life activity
		Understands the interrelationship between human activities and the state of the environment. Can apply the principles of sustainable development when making environmentally sound decisions.		Ecology and sustainable development
		Have an understanding of IT competencies and entrepreneurial skills.		Startups and entrepreneurship
		Understands the fundamental principles of inclusive education, the legislative and ethical foundations of inclusion, and can apply strategies to adapt the educational process for learners with special educational needs. Is capable of developing an inclusive environment and collaborating with various stakeholders in the educational process, taking into account the individual characteristics of learners.		Inclusive education

BASIC MODULES				
BM6515 Physics and mathematics module (AI)	30	Has a fundamental knowledge about limits, continuity, derivatives, and integrals. Knows the methods of differential and integral calculus and, is able to apply them to solve theoretical and applied problems, including the analysis of functions of one and several variables. Possesses skills in using integrals and partial derivatives in mathematical modeling tasks.	Oral interview, testing, report, midterm control, calculation and graphic work	Mathematical analysis 1, 2
		Knows: vectors and vector spaces, their main properties, operations (addition, scalar multiplication), and the concept of linear independence. Matrix operations such as addition, multiplication, transposition, inversion, and determinant calculation. Equations of lines and planes in space, their mutual positions, as well as the use of parametric and canonical representations. Able to: solve systems of linear equations using various methods, analyze the existence and number of solutions; write equations of different curves — circles, ellipses, parabolas, hyperbolas — and analyze their geometric properties.	Oral interview, testing, report, midterm control, calculation and graphic work	Algebra and Geometry
		Development of logical and abstract thinking for solving complex mathematical problems. Ability to apply methods of discrete mathematics and logic for modeling, analyzing, and optimizing processes in various fields such as computer science, cryptography, information processing, and artificial intelligence.	Oral interview, testing, report, midterm control, calculation and graphic work	Discrete Mathematics and Mathematical Logic
		Knows: the basic principles, methods, and results of modern probability theory and mathematical statistics. Able to: calculate probabilities of random events and probabilistic characteristics of random variables; process statistical data; build adequate probabilistic and statistical models of real processes and phenomena, conduct their mathematical analysis; evaluate the quality of solutions obtained for applied problems. Proficient in: methods of classical probability theory; skills in mathematical formalization of applied problems, analysis, and interpretation of solutions of mathematical models.	Oral interview, testing, report, midterm control, calculation and graphic work	Probability Theory
		Mastery of various methods for solving differential equations, integrals, boundary value problems, and optimization. Development and application of numerical methods for solving mathematical problems, such as methods for solving linear and nonlinear equations, numerical integration and differentiation methods, and methods for finding extrema.	Oral interview, testing, report, midterm control, calculation and graphic work	Computational mathematics
BM6516 Computer Modeling Module (DS)	35	Know: organize the necessary data structures depending on the requirements of the task; Be able to: develop block diagrams of various algorithms; Have the skills to develop programs in C++ using language tools.	Oral interview, testing, report, midterm control,	Fundamentals of Programming

		Be able to develop sorting algorithms such as bubble sort, merge sort, quick sort, etc. Have a basic understanding of OOP concepts, C++ theory, methods and technologies, data structures and algorithms; application of algorithms and modern trends in technologies of a large company	calculation and graphic work	Object-oriented programming
		Able to know: basic algorithms for solving biological processes of various natures; Able to use software language tools to solve biological problems and be able to perform data analysis and identify trends. Have the skills to: implement algorithms and data structures, as well as use programming language functions using modern software tools.	Oral interview, testing, report, midterm control, calculation and graphic work	Algorithms and data structures
		Able to collect and analyze information related to the professional field. Able to work with educational, methodological and regulatory documents. Prepares practice reports in accordance with established requirements.	Report	Teaching practice
		Knows how to apply technologies for designing the structure of a website as an information system	Oral interview, testing, report, midterm control, calculation and graphic work	WEB technology
		Knows modern statistical methods and economic theory.		Statistics for data analysis
		Knows how to apply programming skills to build predictive models, data visualization and work with neural networks.		Python for data analysis
BM6517 Optimization and modeling in AI Module (AI)	21	The course explains what a database system is and then moves on to most of the teaching material to learn relational database systems—databases designed according to the relational (or tabular) model. The course then moves from data abstraction to transaction management, with additional material on improving query performance. Finally, modern trends in database system design have emerged that also shape recent developments in the broader history of data storage technologies.	Oral interview, testing, report, midterm control, calculation and graphic work	Database theory and design
		Know the basics of machine learning theory, including discriminant, cluster and regression analysis, mastering the skills of practical solution of data mining problems.		Fundamentals of Neural Networks and Machine Learning
		Designed to study various optimization methods that are used in the field of artificial intelligence. Students will study basic optimization algorithms and learn how to apply them in various artificial intelligence tasks, such as machine learning, deep learning, neural networks and others.		Optimization methods in artificial intelligence
		The discipline studies methods and technologies for complex analysis and processing of data from various sources, such as text, sound, images and video. Students learn to develop integrated systems capable of processing and interpreting multimodal data to solve a variety of problems.		Multi-model artificial intelligence systems

BM6518 Professional Language Training Module (AI)	7	Identify linguistic forms used to express various types of information in scientific texts to solve tasks related to academic and professional communication; principles of composing texts in key educational-scientific and scientific-professional genres.		Business correspondence in the state language
		Able to characterize — basic reading rules; word-formation models; contextual meanings of polysemous words; terms and lexical constructions of the sublanguage corresponding to the profile of the studied specialty; the most frequent specific grammatical phenomena. Understand statements in a foreign language, features of the compositional-semantic organization of scientific texts; main techniques for extracting the core information of a microtext.	Oral interview, testing, report, midterm control, semester papers	Professionally oriented foreign language
PROFESSIONAL MODULES				
PM6513 Intelligent interfaces and robotics Module	10	Mastering the basics of Swift programming and using the Xcode environment to create mobile applications. Ability to design interfaces using UIKit or SwiftUI, as well as implement functionality taking into account the requirements of the iOS platform. The acquired skills allow you to develop modern, user-oriented mobile applications.	Oral interview, testing, report, midterm control, calculation and graphic works	Development of mobile applications on iOS
		Mastering the basics of programming in Kotlin (or Java) and using the Android Studio environment. Ability to develop interfaces, interact with databases and external services, and take into account the features of the life cycle of Android applications. The knowledge gained allows you to create full-featured and convenient mobile applications for the Android platform.		Development of mobile applications on Android
		Knows the basic methods and algorithms of computer graphics, including modeling, transformations, rendering and animation. Can develop simple 2D/3D graphics applications using graphics libraries. Has skills in visualization and working with graphics tools.	Oral interview, testing, report, midterm control, calculation and graphic works	Computer graphics
		Knows the principles of building intelligent systems and methods of artificial intelligence. Can develop simple intelligent agents and apply machine learning and logical inference algorithms. Has the skills to use AI tools to solve practical problems.		Intelligent systems
		Knows the basics of multi-agent systems and the principles of interaction between intelligent agents. Can model agent behavior, develop simple multi-agent systems and apply them to solve distributed problems. Has the skills to analyze cooperation, competition and communication between agents.		Multi-agent artificial intelligence systems
		Knows the basics of robotics, including the design and operating principles of robots. Can develop and program simple robotic systems. Has skills in motion control, sensor processing, and hardware/software integration.		Robotics
PM6511 Deep AI and its Applications Module	24	The discipline is aimed at studying methods and models of deep learning, considers quantitative and qualitative areas of machine learning (Machine	Oral interview, testing, report,	Deep Learning 1, 2

		Learning), methods for solving problems of artificial intelligence (Artificial Intelligence) using deep neural networks. The discipline develops students' knowledge of the use of deep learning systems in areas such as computer vision, speech recognition, natural language processing, audio recognition, bioinformatics and others.	midterm control, calculation and graphic works	
		The discipline explores the ethical and moral issues surrounding the creation, development, and use of artificial intelligence technologies. It discusses issues of transparency, accountability, safety, and fairness in the development and use of AI, as well as the impact of artificial intelligence on society and humanity.		Ethics of Artificial Intelligence
		This course will focus on practical implementation of artificial intelligence in various industries, including case studies and real-world applications.		AI in Industry and Research
		Developing autonomous decision-making systems has been one of the long-standing goals of artificial intelligence. Such decision systems, if implemented, could have a major impact on machine learning in robotics, gaming, management, healthcare, and many other fields. This course introduces reinforcement learning as a general framework for the design of such autonomous decision systems.		Reinforcement Learning
PM6512Systems Design and AI module	25	As part of this discipline, the student becomes familiar with information from images. Fundamentals of image processing (noise reduction, color correction, edge extraction), image classification (basic functions), image search by content (descriptor compression, approximate methods for comparing descriptors).	Oral interview, testing, report, midterm control, calculation and graphic works	Image Processing and Computer Vision I, II
		The purpose of the course: to familiarize students with the principles, methods and tools of software design using the currently most common programming language, Java, and related software development tools.		System Design
		The goal of the discipline is to master the theory and practice of natural language processing. The course covers the theoretical aspects of the NLP language, including basic information from the field of linguistics, as well as practical methods of text processing using natural language tools.		NLP and Prompt Management
		The course is designed to familiarize you with modern methodologies of project work for the development of complex software products. It outlines the discipline of project management as a tool for creating high-quality products within a defined budget and schedule. The course also introduces agile methodologies.		Software Project Management
PM6510 AI Practice module	12	Knows the organizational structure and complex of technical means of the information and analytical center (IAC) of the organization. Able to identify the main problems solved by the IAC. Knows the mathematical support of the selected task (set of tasks or subsystem) and the software of the selected task (set of tasks or subsystem), organizational and legal support of the selected task (set of tasks or subsystem). systematization and analysis of factual	Report	Industrial practice
				Pregraduation practice

		materials necessary for writing a course work, scientific report and internship report.		
PM6514 Module of Minor disciplines (AI)	15	Able to apply acquired knowledge in the chosen additional educational program.	Oral questioning, testing, report, midterm control	Minor 1, 2, 3

11. Information about the disciplines of the educational program

№	Code and Name of discipline	Brief description of the discipline (30-50 words)	Labor intensity of discipline in credits	Formed learning outcomes (codes)	Prerequisites	Postrequisites
Cycle of general education disciplines (GED) Required component (RC)						
1.	History of Kazakhstan	This course consists of teaching the history of the country to understand the role and significance of current events in a historical context.	5	LO1 LO2	-	-
2.	Philosophy	This course consists of teaching philosophy to develop a conscious attitude towards the environment.	5	LO3	-	-
3.	Foreign language	This course consists of teaching a foreign language to develop communication skills in a foreign language.	10	LO4	-	
4.	Kazakh (Russian) language	This course consists of teaching the Kazakh / Russian language to develop communication skills in the state, Russian languages.	10	LO4		
5.	Information and communication technologies	The course contains an overview of various areas of ICT, allowing students to gain basic knowledge on the use of modern ICT in their scientific and practical work, for independent study and other purposes.	5	LO3 LO5		
6.	Political Science - Sociology	The course gives students knowledge about the political sphere of society, an understanding of the relationship and mutual influence of politics and management, as well as sociology for understanding society and social development.	4	LO1 LO2 LO3		
7.	Cultural studies - Psychology	The course forms the necessary knowledge about cultural studies, develops an understanding of the uniqueness of cultures of peoples, and the course also introduces various concepts, basic concepts, and laws of psychology.	4	LO2 LO3		
8.	Physical education	The course provides solutions to the main tasks of physical education of students, provides for passing control exercises and standards.	8	LO3		
Cycle of general education disciplines (GED) Elective Component (EC)						
9.	Elective discipline 1 (GED)		5			
	Startups and entrepreneurship	This course provides an introduction to what a business is, how it works and how to run it. Students will define ownership and processes used in manufacturing and marketing, finance, personnel, and management in business operations.		LO10 LO11		
	Fundamentals of law and anti-corruption culture	The course outlines the legal, economic, and social foundations of fighting corruption. Throughout the course, students will gain practical knowledge in identifying the peculiarities of state policies, applying international experiences in combating		LO10 LO11		

		corruption, mastering skills in conflict resolution, and detecting corruption activities using professional ethics and methods. After successful completion of the course, students will gain the following competencies: 1. Understand the measures of legal responsibility for participation in corruption violations. 2. Determine the conflict of interests in the activities of organizations leading to corruption. 3. Analyze the work of organizations using various research methods.				
	Fundamentals safety of life activity	Studying ways of safe human interaction with the environment (industrial, domestic, urban, natural), sustainable operation of business facilities (organizations) in emergency situations, issues of protection from negative factors, prevention and elimination of the consequences of natural and man-made emergencies and the use of modern means defeat.		LO10 LO11		
	Ecology and sustainable development	The course reveals the role of ecology in solving modern economic, social and political problems, as well as the emergence of global environmental problems as a result of human production activities and the responsibility of the world community for them. A very important aspect is also international cooperation to ensure sustainable development. Various areas of practical application of ecology are also considered - natural resources and environmental pollution.		LO10 LO11		
	Research metodology	The course is devoted to the study of activities aimed at developing students " ability to independent theoretical and practical judgments and conclusions, skills of objective evaluation of scientific information, freedom of scientific research and the desire to apply scientific knowledge in educational activities, including for the diploma project (work).		LO10 LO9		
	Foundation of economics and financial literacy	This course provides an integrated introduction to economics and legal foundations relevant to entrepreneurial decision-making and everyday personal finance. Students will understand basic economic principles and navigate legal systems affecting individuals and businesses and learn how to manage personal finances. Topics include economic behavior, legal research, business budgeting, taxation, investment and case analysis. The course is open to non-economics majors interested in how economic, legal and financial systems shape our lives.		LO10 LO11		
	Inclusive education	The philosophy, history and methodology of an inclusive approach. Documents governing the development of an inclusive process in higher professional education. Educational needs of students with disabilities and disabilities. Methods and		LO10 LO9		

		forms of organization of the educational process at a university for students with disabilities. Development of adapted educational programs, curricula and educational paths for students with disabilities and disabilities. Psychological and pedagogical support of students with disabilities and disabilities at the university.				
Cycle of basic disciplines (BD) University component (UC)						
10.	Mathematical analysis 1	The purpose of the course is to introduce students to important branches of calculus and its applications in computer science. During the educational process, students must become familiar with and be able to apply mathematical methods and tools to solve various applied problems. Moreover, they will learn fundamental methods for studying infinitesimal variables using analysis, which is based on the theory of differential and integral calculations.	6	LO2	-	Mathematical analysis 2
11.	Mathematical analysis 2	The course explains the basic concepts of the definite integral and its properties; use various mathematical methods to evaluate integrals, apply certain integrals to solve applied problems; develop methods of numerical integration; define the concepts of infinite series, approximations of functions and the concept of convergence; use infinite series in approximate calculations.	5	LO2	Mathematical analysis 1	Computational mathematics
12.	Algebra and geometry	The goals of the course are to familiarize students with important sections of linear algebra and analytical geometry. During the educational process, students should become familiar with and be able to apply algebraic and geometric methods and tools to solve various applied problems with such important concepts as matrices, determinants, matrix rank, vectors, lines, planes, linear and Euclidean space, linear transformations and quadratic forms .	4	LO2	-	Optimization methods in artificial intelligence
13.	Optimization methods in artificial intelligence	The discipline "Optimization Methods in Artificial Intelligence" is intended to study various optimization methods that are used in the field of artificial intelligence. Students will study basic optimization algorithms and learn how to apply them in various artificial intelligence tasks, such as machine learning, deep learning, neural networks and others.	5	LO2 LO9	Algebra and geometry, statistics	
14.	Object-oriented programming	This course will provide skills in developing console or window applications using the Java programming language using object-oriented programming concepts. Course topics include the OOP paradigm, Java programming, file handling, exceptions, structures, collections, object-oriented programming concepts.	5	LO1	Fundamentals of Programming	Algorithms and data structures
15.	Computational mathematics	The course includes: Fundamentals of error theory, Systems of linear algebraic equations, Nonlinear equations and systems of nonlinear equations, Interpolation and	6	LO2 LO9	Mathematical analysis 2	

		best approximations, Differentiation and integration of functions, Ordinary differential equations, Equations of mathematical physics.				
16.	Algorithms and data structures	The course is designed to study algorithms and development programs for solving various problems. For this purpose, the program structure, principles of constructing algorithms and programs, methods of solution, algorithmization, programming, debugging and implementation of programs using a programming language are considered.	5	LO1	Object-oriented programming	ED from CED
17.	WEB technology	The course includes technology for designing the structure of a website as an information system; technology for creating a website using programming tools on the client and server sides; technology for hosting, supporting and maintaining a website on a server.	5	LO1, LO4 LO7	ICT	
18.	Fundamentals of Programming	The discipline "Programming Fundamentals" is an introduction to the basic principles of writing computer programs. Students learn the basic concepts of algorithms, data structures, variables, conditions, and loops. The course teaches basic programming languages such as Python, Java or C++ and helps students develop logical thinking and problem solving skills.	6	LO1	-	Object-oriented programming
19.	Teaching practice	Practice includes detailing the finishing blocks of a generalized scheme, identifying the necessary classes and methods, defining sets of logically interconnected data (data flows), introducing various additional tools to ensure visibility and improve the level of service of the designed program, developing a generalized algorithm diagram, developing and debugging the program, implementing the designed model.	2	LO1, LO2	-	-
Cycle of basic disciplines (BD) Elective component (EC)						
20.	Probability theory	The course focuses on probability, as well as the relationship between mathematics and modeling, operating systems in an interdisciplinary curriculum covering the branch of mathematical analysis.	3	LO9	Mathematical analysis	Statistics for data analysis
21.	Discrete mathematics and mathematical logic	Discrete mathematics is the branch of mathematics devoted to the study of discrete objects (here, discrete means consisting of separate or unrelated elements). More generally, discrete mathematics is used whenever objects are counted, when relationships between finite (or countable) sets are studied, and when processes involving a finite number of steps are analyzed. The main reason for the growing importance of discrete mathematics is that information is stored and processed by computers in a discrete manner.	6	LO2, LO9	-	
22.	Statistics for data analysis	The course focuses on the statistics of any event, as well as the relationship between mathematics and modeling, operating	6	LO2	Probability theory	Fundamentals of

		systems within the framework of an interdisciplinary training program covering the section of modern statistical methods and economic theory.				NN and ML
23.	Database theory and design	The course explains what a database system is and then moves on to most of the teaching material to learn relational database systems—databases designed according to the relational (or tabular) model. The course then moves from data abstraction to transaction management, with additional material on improving query performance.	5	LO3 LO7 LO9	Programming basics	
24.	Python for data analysis	At the end of the course, students will have mastered the fundamentals of Python programming and become familiar with the entire Data Science workflow, from interacting with SQL databases to query and retrieve data, to data manipulation, transformation, summarization, analysis, and ultimately reporting on their data. results. The course will introduce and use popular Python libraries such as pandas and NumPy, and all analyzes will be performed using Jupiter notebooks.	5	LO1, LO7	Programming basics	Fundaments of NN and ML
25.	Business correspondence in the state language	Record keeping in the state language is a very important subject for students, because This discipline teaches the preparation and execution of documents in the state language, develops practical skills and the ability to independently compose and translate documents into Kazakh.	3	LO6		
26.	Professionally oriented foreign language	The Professional English course focuses on topics of professional interest such as future trends in IT, computer as a friend, computer as an enemy, minimizing the negative impacts of IT, magnetic storage, optical storage, flash memory, programming languages, web design, graphics. design, etc. It is designed to enhance students' language awareness, improve their speaking skills and professional English communication skills.	4	LO6		
27.	Fundamentals of Neural Networks and Machine Learning	Fundamentals of Neural Networks and Machine Learning is a discipline dedicated to the study of the basic principles and architecture of neural networks, as well as general concepts of machine learning. During the training, students become familiar with the theoretical foundations of the operation of neural networks, their structures and functionality.	5	LO3 LO4 LO7	Python for data analysis	Deep learning 1
28.	Multimodel artificial intelligence systems	The discipline "Multimodel Artificial Intelligence Systems" studies methods and technologies for complex analysis and processing of data from various sources, such as text, sound, images and video. Students learn to develop integrated systems capable of processing and interpreting multimodal data to solve a variety of problems.	4	LO3 LO4 LO8	Database theory and design	
Cycle of professional disciplines (PD) University component (UC)						
29.	Industrial practice	The practice includes the study of the organizational structure and complex of	7	LO4, LO6	-	-

		technical means of the information and analytical center (IAC) of the organization. Identification of the main tasks solved by the IAC. Study of information, mathematical, software of the selected task (set of tasks or subsystem).				
30.	Pregraduation practice	Practice includes consolidation of theoretical knowledge in academic disciplines of the specialty; mastering practical skills, technology of work in the specialty directly at the workplace using a PC, modern software and modern office equipment; study and analysis of the real situation in the statics and dynamics of CAD in the short and long term in relation to the enterprise - the base for the internship; collecting material for graduation projects.	5	LO4, LO6	-	-
Cycle of professional disciplines (PD) Elective component (EC)						
31.	Deep Learning 1, 2	The discipline is aimed at studying methods and models of deep learning, considers quantitative and qualitative areas of machine learning, methods for solving artificial intelligence problems using deep neural networks. The discipline develops students' knowledge of the use of deep learning systems in areas such as computer vision, speech recognition, natural language processing, audio recognition, bioinformatics and others.	6, 5	LO3 LO4 LO7 LO8		
32.	Image Processing and Computer Vision I, II	As part of this discipline, the student becomes familiar with information from images. Fundamentals of image processing (noise reduction, color correction, edge extraction), image classification (basic functions), image search by content (descriptor compression, approximate methods for comparing descriptors).	5, 5	LO4, LO7		
33.	AI in Industry and Research	This course will focus on practical implementation of artificial intelligence in various industries, including case studies and real-world applications.	5	LO5 – LO9		
34.	System Design	The purpose of the course: to familiarize students with the principles, methods and tools of software design using the currently most common programming language, Java, and accompanying tools for developing software systems.	5	LO4 LO6 LO7		
35.	NLP and Prompt Management	The goal of the discipline is to master the theory and practice of natural language processing. The course covers the theoretical aspects of the NLP language, including basic information from the field of linguistics, as well as practical text processing techniques using natural language tools and system queries to solve practical problems using NLP.	5	LO4 LO6 LO7		
36.	Software Project Management	The course "Software Project Management" is designed to familiarize you with modern methodologies of project work for the development of complex software products.	5	LO3 LO4 LO6		

		It outlines the discipline of project management as a tool for creating high-quality products within a defined budget and schedule. The course also introduces agile methodologies.				
37.	Reinforcement Learning	Developing autonomous decision-making systems has been one of the long-standing goals of artificial intelligence. This course introduces reinforcement learning as a general framework for the design of such autonomous decision systems. By the end of this course, you will have a solid knowledge of the basic challenges of RL system design and how to approach them.	5	LO1 LO4 LO9		
38.	Ethics of AI	The Ethics of AI discipline examines ethical and moral issues related to the creation, development and use of artificial intelligence technologies. She discusses issues of transparency, accountability, safety and fairness in the development and application of AI, as well as the impact of artificial intelligence on society and humanity.	3	LO5		
39.	Elective discipline 2	Students choose an elective	5			
	Robotics	Comprehensive and comprehensive coverage of robotics as a science and technology. Topics are covered from the basics to advanced applications and services, providing opportunities for students to get hands-on experience with Arduino and desktop robots.		LO1, LO4 LO7		
	Computer graphics	Theoretical foundations for constructing mappings of geometric images on a plane and methods for solving engineering problems in a drawing are studied. Studying the discipline develops spatial and logical thinking, gives students the ability and skills to present technical ideas using drawings in the AutoCAD environment. The goal of the discipline is complete mastery of drawing as a means of expressing technical thought. The subject of computer graphics is the automation of the construction of graphic models, their transformation and research.		LO4 LO6		
	Intelligent systems	The course studies the representation of knowledge in information systems as an element of artificial intelligence and new information technologies, the classification of intelligent systems. Technology of design and operation of intelligent systems. The course studies classes of intelligent systems: expert systems, artificial neural networks, computational and logical systems, systems with genetic algorithms, natural language systems.		LO4 LO5		
	Multi-agent systems of artificial intelligence	The purpose of the discipline is to teach advanced methods, models, tools and technologies for computer information processing and automated control based on the theory of artificial agents and multi-agent systems (MAS)		LO4		

40.	Elective discipline 3	Students choose an elective	5			
	Mobile application development on Android	The course includes creating backend, frontend programming on Android, creating a program interface and uploading a program to PlayMarket. The course includes creating a backend, frontend programming on Android, creating a program interface and uploading a program to PlayMarket.		LO1, LO4		
	Mobile application development for iOS	The student will master the features of databases and information support for solving applied problems in iOS operating systems; will use the capabilities of corporate information systems to support information support for solving applied problems; will have basic skills in database administration of corporate information systems.		LO1, LO4		
41.	Minor 1	Additional educational program (Minor) - a set of disciplines and (or) modules and other types of educational work, determined by the student for study in order to develop additional competencies	5	LO12		Minor 2
42.	Minor 2				Minor 1	Minor 3
43.	Minor 3				Minor 2	

12. Curriculum of the educational program (Platonus)

№	Module Code	Module Name in Three Languages (Kazakh / Russian / English)	Discipline code	Course Name in Three Languages (Kazakh / Russian / English)	Cycle (GED, BD, PD)	Component (RC, EC, UC)	Total Credits (ECTS)	Total Academic Hours	Number of contact hours				Number of hours		Assessment Method (Att. 1, Att. 2, Exam, Coursework/Project, Differentiated Pass/Fail, Thesis/Dissertation Defense)	Prerequisites (Course Code)
									Total contact hours	including:			Total SIS hours	including TSIS		
										Lectures	Practical sessions (seminars)	Laboratory sessions				
1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4
1 course																
1 semester																
1	OOM6002	Тіл және АКТ-дағдыларын дамыту / Развития языковых и ИКТ-навыков / Language and ICT skills development	LAN6001A	Шет тілі / Иностранный язык / Foreign language	GED	RC	5	150	45	0	45	0	105	15	MT, ET, exam	-
2	OOM6001	Әлеуметтік-мәдени даму модулі / Модуль социально-культурного развития / Module of social and cultural development	HK6002	Қазақстан тарихы / История Казахстана / History of Kazakhstan	GED	RC	5	150	45	15	30	0	105	15	MT, ET, exam	-
3	OOM6002	Тіл және АКТ-дағдыларын дамыту / Развития языковых и ИКТ-навыков / Language and ICT skills development	ICT6001	Ақпараттық-коммуникациялық технологиялар / Информационно-коммуникационные технологии / Information and Communication Technologies	GED	RC	5	150	45	15	0	30	105	15	MT, ET, exam	-
4	OOM6001	Әлеуметтік-мәдени даму модулі / Модуль социально-культурного развития / Module of social and cultural development	SPS6501	Әлеуметтану - Саясаттану / Социология-Политология / Sociology - Political science	GED	RC	4	120	45	15	30	0	75	15	MT, ET, exam	-
5	BM6515	Физика - математикалық модуль / Физико-математический Модуль / Physics and Mathematics module (AI)	MAT6501	Математикалық талдау 1 / Математический анализ 1 / Mathematical analysis 1	BD	UC	6	180	60	30	30	0	120	15	MT, ET, exam	-
6	BM6515	Физика - математикалық модуль / Физико-	MAT6001	Алгебра және геометрия / Алгебра и геометрия / Algebra and Geometry	BD	UC	4	120	45	15	30	0	75	15	MT, ET, exam	-

		математический Модуль / Physics and Mathematics module (AI)														
7	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	SFT6001	Бағдарламалау негіздері / Основы программирования / Fundamentals of Programming	BD	UC	6	180	60	15	15	30	120	15	MT, ET, exam	-
8	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	SFT6558	WEB технологиялары / WEB технологии / WEB technology	BD	UC	5	150	45	15	15	15	105	15	MT, ET, exam	-
				Total for 1 semester:			**40**	**1200**	**390**	**120**	**195**	**75**	**810**	**120**		
						2 semester										
9	OOM6002	Тіл және АКТ-дағдыларын дамыту / Развития языковых и ИКТ-навыков / Language and ICT skills development	LAN6002A	Шет тілі / Иностранный язык / Foreign language	GED	RC	5	150	45	0	45	0	105	15	MT, ET, exam	-
10	OOM6003	Дене шынықтыру модулі / Модуль физической культуры / Physical training module	PhC6005	Дене шынықтыру / Физическая культура / Physical Culture	GED	RC	4	120	45	0	45	0	75	15	MT,ET, diff/offset	-
11	BM6515	Физика - математикалық модуль / Физико-математический Модуль / Physics and Mathematics module (AI)	MAT6502	Математикалық талдау 2 / Математический анализ 2 / Mathematical analysis 2	BD	UC	5	150	45	15	30	0	105	15	MT, ET, exam	MAT6501
12	BM6515	Физика - математикалық модуль / Физико-математический Модуль / Physics and Mathematics module (AI)	MAT6509	Дискреттік математика және математикалық логика / Дискретная математика и математическая логика / Discrete Mathematics and Mathematical Logic	BD	EC	6	180	60	30	30	0	120	15	MT, ET, exam	-
13	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	PP6501	Оқыту практика / Учебная практика / Teaching practice	BD	UC	2	60	30	30	0	0	30	0	offset	-
14	BM6515	Физика - математикалық модуль / Физико-математический Модуль / Physics and Mathematics module (AI)	MAT6520	Ықтималдық теориясы / Теория вероятности / Probability Theory	BD	EC	3	90	30	15	15	0	60	15	MT, ET, exam	-
15	BM6517	AI жүйесінде оңтайландыру және модельдеу модулі / Модуль Оптимизация и моделирование в ИИ/ Module of Optimization and modeling in AI	SFT6544	Дерекқордың теориясы және жобалау / Теория и проектирование базы данных / Database theory and design	BD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	SFT6501

16	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	SFT6517	Объектті-бағдарланған программалау / Объектно-ориентированное программирование / Object-oriented programming	BD	UC	5	150	45	15	15	15	105	15	MT, ET, exam	SFT6001
17	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	SFT6503	Деректерді талдауға арналған Python / Python для анализа данных / Python for Data Analysis	BD	EC	5	150	45	15	0	30	105	15	MT, ET, exam	SFT6516
				Total for 2 semester:			**40**	**1200**	**390**	**135**	**195**	**60**	**810**	**120**		
				TOTAL FOR 1 COURSE:			**80**	**2400**	**780**	**255**	**390**	**135**	**1620**	**240**		
2 course																
3 semester																
18	OOM6002	Тіл және АКТ-дағдыларын дамыту / Развития языковых и ИКТ-навыков / Language and ICT skills development	LAN6001KR	Қазақ (орыс) тілі / Казахский (русский) язык / Kazakh (Russian) language	GED	RC	5	150	45	0	45	0	105	15	MT, ET, exam	-
19	OOM6003	Дене шынықтыру модулі / Модуль физической культуры / Physical training module	PhC6006	Дене шынықтыру / Физическая культура / Physical Culture	GED	RC	4	120	45	0	45	0	75	15	MT,ET, diff/offset	-
20	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	SFT6501	Алгоритмдер және деректер құрылымы / Алгоритмы и структуры данных / Algorithms and data structures	BD	UC	5	150	45	15	15	15	105	15	MT, ET, exam	SFT6517
21	BM6515	Физика - математикалық модуль / Физико-математический Модуль / Physics and Mathematics module (AI)	MAT6504	Есептеу математикасы / Вычислительная математика / Computational mathematics	BD	UC	6	180	60	15	15	30	120	15	MT, ET, exam	MAT6531
22	BM6516	Компьютерлік моделдеу модулі/ Модуль компьютерного моделирования / Computer Modeling Module (AI)	MAT6507	Деректерді талдауға арналған статистика / Статистика для анализа данных / Statistics for data analysis	BD	EC	6	180	60	30	30	0	120	15	MT, ET, exam	MAT6520
23	BM6518	Кәсіби тілдік даярлық модулі / Модуль профессиональных язы-ковых подготовок/ Professional Language Training Module (AI)	LAN6002PA	Кәсіби бағытталған шет тілі / Профессионально-ориентированный иностранный язык / Professionally oriented foreign language	BD	EC	4	120	45	0	45	0	75	15	MT, ET, exam	-
24	BM6517	AI жүйесінде оңтайландыру және модельдеу модулі / Модуль Оптимизация и моделирование в ИИ/ Module of Optimization and modeling in AI	SFT6546	Нейрондық желілер және машиналық оқыту негіздері / Основы нейронных сетей и Машинное обучение / Fundamentals of Neural Networks and Machine Learning	BD	EC	5	150	45	15	0	30	105	15	MT, ET, exam	SFT6503

25	PM6513	Интеллектуалды интерфейстер және робототехника модулі/ Модуль Интеллектуальные интерфейсы и робототехника / Intelligent interfaces and robotics Module	SFT6525	Android үшін мобильді қосымшаларды әзірлеу / Разработка мобильных приложений на Android / Mobile application development on Android	PD	EC	5	150	45	15	0	30	105	15	MT, ET, exam	MAT6506
			SFT6515	iOS үшін мобильді қосымшаларды әзірлеу / Разработка мобильных приложений на IOS / Mobile application development on iOS												
				Total for 3 semester:			**40**	**1200**	**390**	**90**	**195**	**105**	**810**	**120**		
				4 semester												
26	OOM6002	Тіл және АКТ-дағдыларын дамыту / Развития языковых и ИКТ-навыков / Language and ICT skills development	LAN6002KR	Қазақ (орыс) тілі / Казахский (русский) язык / Kazakh (Russian) language	GED	RC	5	150	45	0	45	0	105	15	MT, ET, exam	-
27	OOM6001	Әлеуметтік-мәдени даму модулі / Модуль социально-культурного развития / Module of social and cultural development	SPS6502	Мәдениеттану - психология / Культурология - психология / Cultural studies - Psychology	GED	RC	4	120	45	15	30	0	75	15	MT, ET, exam	-
28	OOM6004	Жеке және әлеуметтік даму модулі / Модуль личностного и общественного развития / Module of personal and social development	RM6001	Зерттеу әдістемесі / Методология исследования / Research metodology	GED	EC	5	150	45	15	30	0	105	15	MT, ET, exam	-
			JUR 6505	Экология және тұрақты даму / Экология и устойчивое развитие / Ecology and Sustainable Development												
			LAW6007	Заң және сыбайлас жемқорлыққа қарсы мәдениеттің негіздері / Основы права и антикоррупционной культуры / Fundamentals of law and anti-corruption culture												
			MGT6706	Стартаптар және кәсіпкерлік / Стартапы и предпринимательство / Startups and entrepreneurship												
			JUR6413	Тіршілік қауіпсіздігінің негіздері / Основы безопасности жизнедеятель-ности / Fundamentals of Life Safety												
			ECO6007	Экономика және қаржылық сауаттылық негіздері / Основы экономики и финансовой грамотности / Fundamentals of Economics and Financial Literacy												
			HUM6400	Инклюзивті білім беру / Инклюзивное образование / Inclusive education												

29	PM6512	Жүйелерді жобалау және ЖИ модулі/ Модуль Системное проектирование и ИИ/ Systems Design and AI module	SFT6547	Бағдарламалық жасақтаманың жобаларды басқару / Управление программными проектами / Software Project Management	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	
30	PM6510	ЖИ Тәжірибе модулі/ Модуль практик в ИИ / Practice module in AI	PP6502	Өндірістік практика / Производственная практика / Industrial practice	PD	UC	7	210	0	0	0	0	210	0	report	-
31	PM6511	Терең ЖИ және оның қолданбалары модулі/ Модуль ГлубRСий ИИ и его применение / Deep AI and its Applications Module	SFT6554	Терең оқыту 1/ Глубокое обучение 1/ Deep Learning 1	PD	EC	6	180	60	15	15	30	120	15	MT, ET, exam	
32	PM6514	Майнор пәндер модулі / Модуль Майнор дисциплин / The module of Minor disciplines (AI)	MIN601	Майнор 1 / Майнор 1 / Minor 1	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	-
33	PM6511	Терең ЖИ және оның қолданбалары модулі/ Модуль Глубокий ИИ и его применение / Deep AI and its Applications Module	SPS6501	ЖИ этика / Этика ИИ / Ethics of AI	PD	EC	3	90	30	15	15	0	60	15	MT, ET, exam	
				Total for 4 semester:			**40**	**1200**	**315**	**90**	**165**	**60**	**915**	**105**		
				TOTAL FOR 2 COURSE:			**80**	**2400**	**705**	**180**	**360**	**165**	**1695**	**225**		
3 course																
5 semester																
34	OOM6001	Әлеуметтік-мәдени даму модулі / Модуль социально-культурного развития / Module of social and cultural development	SPS6001	Философия / Философия / Philosophy	GED	RC	5	150	45	15	30	0	105	15	MT, ET, exam	-
35	PM6512	Жүйелерді жобалау және ЖИ модулі/ Модуль Системное проектирование и ИИ/ Systems Design and AI module	SFT6556	Кескіндерді өңдеу және компьютерлік көру I / Обработка изображений и компьютерное зрение I / Image Processing and Computer Vision I	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	
36	PM6512	Жүйелерді жобалау және ЖИ модулі/ Модуль Системное проектирование и ИИ/ Systems Design and AI module	SFT6567	Жүйелік дизайн / Проектирование системы / System Design	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	
37	PM6512	Жүйелерді жобалау және ЖИ модулі/ Модуль Системное проектирование и ИИ/ Systems Design and AI module	SFT6583	НЛБ және жедел басқару / НЛП и оперативный менеджмент / NLP and Prompt Management	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	

38	BM6517	AI жүйесінде оңтайландыру және модельдеу модулі / Модуль Оптимизация и моделирование в ИИ/ Module of Optimization and modeling in AI	MAT6555	Жасанды интеллекттегі оңтайландыру әдістері / Методы оптимизации в искусственном интеллекте / Optimization methods in artificial intelligence	BD	UC	5	150	45	15	15	15	105	15	MT, ET, exam	-
39	PM6511	Терең ЖИ және оның қолданбалары модулі/ Модуль Глубокий ИИ и его применение / Deep AI and its Applications Module	SFT6555	Терең оқыту II / Глубокое обучение II / Deep Learning II	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	
40	PM6514	Майнор пәндер модулі / Модуль Майнор дисциплин / Module of Minor disciplines (AI)	MIN602	Майнор 2 / Майнор 2 / Minor 2	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	MIN601
41	PM6513	Интеллектуалды интерфейстер және робототехника модулі/ Модуль Интеллектуальные интерфейсы и робототехника / Intelligent interfaces and robotics Module	SFT6584	Робототехника / Робототехника / Robotics	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	SFT6516
			SFT6586	Компьютерлік графика / Компьютерная графика / Computer graphics												
			SFT6587	Интеллектуалды жүйелер / Интеллектуальные системы / Intelligent systems												
			SFT6593	Мультиагентті жасанды интеллект жүйелері / Мультиагентные системы искусственного интеллекта / Multi-agent artificial intelligence systems												
				Total for 5 semester:			**40**	**1200**	**360**	**120**	**135**	**105**	**840**	**120**		
6 semester																
42	BM6518	Кәсіби тілдік даярлық модулі / Модуль профессиональных язы-ковых подготовок/ Professional Language Training Module (AI)	LAN6007K	Мемлекеттік тілде іс қағаздарын жүргізу / Делопроизводство на государственном языке / Business correspondence in the state language	BD	EC	3	90	30	0	30	0	60	15	MT, ET, exam	LAN6002KR
43	PM6510	ЖИ Тәжірибе модулі/ Модуль практик в ИИ / Practice module in AI	PP6504	Диплом алдындағы практика / Преддипломная практика / Pregraduation practice	PD	UC	5	150	0	0	0	0	150	15	report	
44	PM6512	Жүйелерді жобалау және ЖИ модулі/ Модуль Системное проектирование и ИИ/ Systems Design and AI module	SFT6557	Кескіндерді өңдеу және компьютерлік көру II / Обработка изображений и компьютерное зрение II / Image Processing and Computer Vision II	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	
45	PM6511	Терең ЖИ және оның қолданбалары модулі/ Модуль Глубокий ИИ и его применение / Deep AI and its Applications Module	SFT6594	Өнеркәсіп пен зерттеулердегі ЖИ / ИИ в промышленности и исследованиях / AI in Industry and Research	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	

46	PM6511	Терең ЖИ және оның қолданбалары модулі/ Модуль Глубокий ИИ и его применение / Deep AI & its Applications Module	SFT6595	Негіздеп Оқыту / Обучение с подкреплением / Reinforcement Learning	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	
47	PM6514	Майнор пәндер модулі / Модуль Майнор дисциплин / Module of Minor disciplines (AI)	MIN603	Майнор 3 / Майнор 3 / Minor 3	PD	EC	5	150	45	15	15	15	105	15	MT, ET, exam	MIN602
48	BM6517	AI жүйесінде оңтайландыру және модельдеу модулі / Модуль Оптимизация и моделирование в ИИ/ Module of Optimization and modeling in AI	SFT6596	Мультимодельді жасанды интеллект жүйелері / Мультимодельные системы искусственного интеллекта / Multi-model artificial intelligence systems	BD	EC	4	120	45	15	15	15	75	15	MT, ET, exam	
49				Дипломдық жұмысты, дипломдық жобаны жазу және қорғау немесе кешенді емтиханды дайындау және тапсыру / Написание и защита дипломной работы, дипломного проекта или подготовка и сдача комплексного экзамена / Writing and defending a diploma thesis, diploma project or preparation and passing of a comprehensive exam			8	240	0	0	0	0	240	15	Defense of diploma	
				Total for 6 semester:			**40**	**1200**	**255**	**75**	**105**	**75**	**945**	**120**		
				TOTAL FOR 3 COURSE:			**80**	**2400**	**615**	**195**	**240**	**180**	**1785**	**240**		
				TOTAL:			**240**	**7200**	**2100**	**630**	**990**	**480**	**5100**	**705**		

Summary table of indicators of the volume of credits of the educational program in the context of cycles of disciplines and semesters of study

Cycle of disciplines / Semester	1 sem.	2 sem.	3 sem.	4 sem.	5 sem.	6 sem.	Total of credits ECTS	Note (Structure EP according to higher education NMS)
Cycle of general education disciplines (GED)	**19**	**9**	**9**	**14**	**5**		**56**	*** 56 cr.**
- including a required component (RC GED)	19	9	9	9	5		51	* 51 cr.
- including an optional component (OC GED)				5			5	* 5 cr.
Cycle of core disciplines (CD)	**21**	**31**	**26**	**0**	**5**	**7**	**90**	******
- including a university component (UC CD)	21	12	11	0	5		49	
- including an optional component (OC CD)		19	15			7	41	
Cycle of profiling disciplines (PD)			**5**	**26**	**30**	**25**	**86**	******
- including a university component (UC PD)				7		5	12	
- including an optional component (OC PD)			5	19	30	20	74	
Professional practice (PP)		*2*		*7*		*5*	*14*	
Additional types of training								
Final attestation (FA)						**8**	**8**	***No less than 8 cr.**
TOTAL credits for the educational program	**40**	**40**	**40**	**40**	**40**	**40**	**240**	**No less than 240 cr.**

** The cycle of basic and profile disciplines (BD, PD) is not less than 176 years

13. Additional Educational Programs (Minor)

The name of the AEP (Minor), indicating the list of disciplines forming the Minor	Number of credits AEP / number of credits in the discipline	Description, Competencies generated by the AEP, learning outcomes
Data protection		Develops skills in information security, including cryptography, database protection, and web application defense.
SEC6206 Cryptographic methods of information protection	5	
SEC6211 Protecting Database Management Systems	5	
SEC6236 Protecting applications and scripts from modifications	5	
Accounting by ACCA		Develops competencies in international accounting, financial reporting, and auditing in accordance with ACCA standards.
ACC6701 Business technology (ACCA)	5	
ACC6702 Financial Accounting	5	
ACC6703 Management Accounting	5	
Management & Leadership		Develops managerial and leadership competencies, including personnel management and behavior in organizations.
MGT6701 Management	5	
MGT6707 Psychology of Management	5	
MGT6702 Organizational Behavior and Leadership	5	
IoT Security Technologies		Provides competencies in the field of IoT security, including IoT technologies, device protection, and biometric control methods.
HRD6202 IoT Technologies	5	
SEC6215 IoT Security	5	
SEC6235 Biometric access control systems	5	