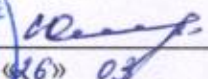


AGREED

by Acting Rector, Chairman of the Board  
LLP «Astana IT University»



  
«26» 03 2024 Omirbaev S.M.

APPROVED

by Chairman of the Board, Rector  
«International Information Technology  
University» JSC



  
«27» 03 2024 Khikmetov A.K.

AGREED

by Rector (Chairman of the Board)  
JSC «Kazakh-British Technical University»




  
«26» 03 2024 Gabdulim M.T.

AGREED

by Chairman of the Board-Rector  
NJSC «D. Serikbayev East Kazakhstan  
technical university»




  
«27» 03 2024 Rakhmetullina S.Zh.

AGREED

by Rector of the NJSC «Almaty University of  
Energy and Communications named after  
Gumarbek Daukeev»



  
«26» 03 2024 Nygymetov G.S.

AGREED

by Rector of JSC «Kenzhegali Sagadiev  
University of International Business»



  
«26» 03 2024 Makhmetova A.M.

## EDUCATIONAL PROGRAM

6B06120 «Artificial intelligence»

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

Code and classification of areas of training: 6B061 - Information and communication technologies

Group of educational programs: 057 – Information technologies

Level according to MCKO: 6

Level according to NQF: 6

Level according to SQF: 6

Duration of study: 3 years

Credits: 240

Almaty, 2024

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## List of designations and abbreviations

CD	Cycle of core disciplines
CC	Core 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
OC	Optional 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
AP	Academic program
GPM	General professional module
SQF	Sectoral qualifications framework
GEC	General education competence
PD	Cycle of profiling disciplines
PI	Professional internship
PS	Professional standard
PE	Postgraduate education
PC	Professional competence
PM	Professional module
LO	Learning outcome
QMS	Quality Management System



## **1. Description of the educational program**

The educational program "Artificial Intelligence" is intended for students interested in the field of artificial intelligence and its applications. The program offers in-depth study of the theoretical foundations of artificial intelligence, as well as practical skills in the areas of machine learning, computer vision, natural language processing and other related disciplines.

## **2. Purpose 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

#### 3.1 General Information

№	Field name	Note
1	Code and classification of the field of education	6B06 – Information and communication technologies
2	Code and classification of study areas	6B061 – Information and communication technologies
3	Educational programs group	057 – Information technology
4	Name of educational program	6B06120 “Artificial Intelligence”
5	Purpose 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 Educational Program	Innovative
Qualification characteristics of the EP graduate		
7	Field of professional activity of an EP graduate	The field of professional activity of graduates of this program is the IT industry, where specialists in the field of artificial intelligence are in demand in various fields, including software development, robotics, machine learning and data analysis.
8	Objects of professional activity of EP graduates	The object of professional activity of program graduates is tasks related to the development and application of artificial intelligence. They can work on creating and training neural networks, developing machine learning algorithms, solving computer vision problems, developing and optimizing genetic programming algorithms, etc.
9	Subject of professional activity	Mathematical, information, software, linguistic, technical, organizational, and legal support: - big data processing software, - intelligent strategic assessment systems, including technologies for design, development, implementation, maintenance and operation.
10	Types of professional activities of EP graduates	Types of professional activities of the graduate: - production and technological; - experimental research; - educational; - organizational and managerial.
11	Functions of professional activity of an EP graduate	Functions of a graduate's professional activity: - design; - programming; - administration; - support;



		- testing.
12	Level according to ISCE	6
13	Level according to NQF	6
14	Level according to SQF	6
15	Number of credits	240
16	Academic degree awarded	Bachelor in Information and Communication Technologies in the educational program "6B06120 – Artificial Intelligence"
17	<p>List of competencies of the educational program:</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>GEC6: Know: the basics of economic theory, the basics of financial literacy, ecology and life safety, research methods; have an understanding of business activities</p> <p>CC1: The ability to actually use the state language, the language of interethnic communication and a foreign language in professional activities.</p> <p>CC2: The ability to understand the basics of economic knowledge, scientific ideas about finance, economics, and ethics of AI.</p> <p>CC3: Ability to program in languages used in the development of artificial intelligence.</p> <p>CC4: Understanding of basic machine learning and deep learning algorithms.</p> <p>CC5: 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.</p> <p>CC6: 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.</p> <p>CC7: Ability to develop information and software for an information system based on modern methods and development tools.</p> <p>CC8: 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</p>	



	order and systems of linear equations with constant coefficients; be able to work with matrices; 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.	
18	List of generalized learning outcomes for 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. PO9: Analyze data, develop and test hypotheses using AI tools to conduct scientific research. RO10: 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.	
19	Form of study	In-person
20	Languages of instruction	English
21	Name of professional standard	1. Development of big data processing and storage systems 2. Development of artificial intelligence applications
22	Atlas of new professions	1. AI technologies 2. Developer of universal AI 3. Multi-experience Diptych specialist (user experience) 4. Designer of artificial neural networks 5. Ethics Consultant
23	EP's strategic partners	REDPRINT LLP (Digital Agency NIDGE) Institute of Ionosphere, Almaty
24	Developer(s) and authors of the educational program:	JSC "International Information Technology University", Department of MCM: - Ydyrys A.Zh. - Nurtas M. - Omarov B.S.

- Olzhayev O.M.

**Table of relationships between competencies, learning outcomes, assessment methods and criteria**

Dublin descriptors	Competencies of an EP graduate	Competencies expressed in expected learning outcomes	Evaluation criteria	Name of assessment method
<b>General educational competencies</b>				
Knowledge and understanding	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
Putting knowledge and understanding into practice	GEC5	LO1	Uses knowledge in the area under study in practice	Project
			Solve complex problems based on acquired knowledge	Multi-level tasks and assignments
Communication skills	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
<b>Core competencies</b>				
Knowledge and understanding	CC2 CC4	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
Putting knowledge and understanding into practice	CC3 CC5 CC6 CC7 CC8	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
Communication skills	CC1	LO6	Able to present his ideas in a compelling manner	Colloquium
<b>Professional competencies</b>				
Putting knowledge and understanding into practice	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
Ability to make judgments, evaluate ideas, and formulate conclusions	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
Self-learning	PC6	LO10 LO11	Able to apply acquired knowledge in the chosen additional educational program	Project

### 3.2 Matrix for correlating the learning outcomes of the educational program with the competencies being developed

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11
CC1						V					
CC2					V			V			
CC3	V							V			
CC4			V								
CC5						V					
CC6		V							V		
CC7	V			V							
CC8		V									
PC1			V					V			
PC2			V								
PC3							V	V	V		
PC4						V		V			
PC5				V				V			
PC6										V	V

**Organization of inclusive education**

The educational program 6B06120 - "Artificial Intelligence" provides for the provision of educational services for persons with limited vision and speech and limited capabilities of the musculoskeletal system in accordance with medical indications. The organization of the educational process for persons with disabilities is regulated by the academic policy of the university. For students with special educational needs (SEN), if necessary, an individual curriculum can be developed with an individual schedule for attending classes. Maintenance of educational programs for persons with disabilities is implemented using e-learning and distance learning technologies (hereinafter referred to as DET). To ensure access to education for students with special education needs, the university uses a form of remote access for students to the resources of the educational portal through the website and personal accounts in [www.platonus.iitu.edu.kz](http://www.platonus.iitu.edu.kz), MsTeams.

In order to adapt students with special education needs, the following is carried out:

- training to work in the information system on the website [www.platonus.iitu.edu.kz](http://www.platonus.iitu.edu.kz), MsTeams;
- training in working with the library's electronic catalogue.



### 3.3. 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
<b>GENERAL EDUCATION MODULES</b>				
GEM01 Sociology and Ethics	5	<p>Has an understanding of the principles and patterns of the historical development of society, the historical periodization of the history of Kazakhstan, the place of the history of Kazakhstan in world history and the history of Eurasia.</p> <p>Able to independently and critically analyze historical and modern sources, draw conclusions, and give reasons for them.</p>	<p>Oral survey, testing, report, midterm control, semester work</p>	<p>History of Kazakhstan</p>
	5	<p>Has an idea of the subject, functions, main sections and directions of philosophy; the place and role of philosophy in the life of society and man; the main stages of the development of world and Kazakh philosophical thought.</p> <p>Able to operate with special philosophical terminology and the categorical-conceptual apparatus of philosophy;</p> <ul style="list-style-type: none"> <li>- work creatively and critically on original philosophical texts;</li> <li>- logically express your thoughts on the philosophical issues being studied;</li> <li>- analyze the features of the genesis and development of philosophical knowledge;</li> <li>- formulate and defend your own worldview with arguments.</li> </ul>	<p>Oral survey, testing, report, midterm control, semester work</p>	<p>Philosophy</p>
	4	<p>Political Science and Sociology consists of two parts: the first part provides comprehensive coverage of all key elements, the study of sources and political relations, types of political systems, democratic and authoritarian systems, political mechanisms, political competition and power, political capital and values, the survival of political ideas, nationalism, analysis of domestic and foreign policy, political growth, public policy in the world political system; In the second part, students will study scientific social knowledge that will help them gain experience in forming patterns of social relations. In addition, they will learn to respect the good values of both Kazakhstan and the rest of the</p>	<p>Oral survey, testing, report, midterm control, semester work</p>	<p>Political Science and Sociology</p>

		world, skills of social communications, interpersonal relationships, respect for the different cultures of Kazakhstan and the world community.		
	4	Culturology and psychology consists of two parts: the first part - knowledge in the field of cultural studies can serve as the basis for the study of the entire complex of social and human sciences. At the same time, it can serve as a supplement to general courses in history and philosophy. Methods and technologies of teaching used in the process of implementing the program: role-playing games and educational discussions of various formats; case study (analysis of specific situations); project method; the second part presents issues of psychology in a broad educational and social context. The knowledge, skills and abilities acquired and developed as a result of mastering the course content give students the opportunity to apply them in practice in various spheres of life: personal, family, professional, business, social, in working with people - representatives of different social groups and age categories .	Oral survey, testing, report, midterm control, semester work	Cultural studies and psychology
	10	Able to characterize – the basic rules of reading; word formation models; contextual meanings of polysemous words; terms and lexical structures of the sublanguage corresponding to the profile of the specialty being studied; the most frequent specific grammatical phenomena. Understand statements in a foreign language, features of the compositional and semantic organization of a scientific text; basic techniques for isolating the main information of microtext.	Oral survey, testing, report, midterm control, semester work	Foreign language
GEM02 Language training	10	Identify linguistic forms of expression of various types of information in a scientific text to solve problems of educational and professional communication; principles of compiling texts of the main educational, scientific, scientific and professional genres.	Oral survey, testing, report, midterm control, semester work	Kazakh (Russian) language
	2	Identify linguistic forms of expression of various types of information in a scientific text to solve problems of educational and professional communication; principles of compiling texts of the main educational, scientific, scientific and professional genres.	Oral survey, testing, report, midterm control, semester work	Business correspondence in the state language
	4	Able to characterize – the basic rules of readings; word formation models;	Oral survey, testing, report, midterm control, semester work	Professionally oriented foreign language



			control, semester work	
GEM03 Information Technology Module	5	<p>contextual meanings of polysemous words; terms and lexical structures of the sublanguage corresponding to the profile of the specialty being studied; the most frequent specific grammatical phenomena. Understand statements in a foreign language, features of the compositional and semantic organization of a scientific text; basic techniques for isolating the main information of microtext.</p> <p>Know:</p> <ul style="list-style-type: none"> <li>- main directions of ICT development;</li> <li>- basics of using information resources for searching and storing information;</li> <li>- architecture and components of computer systems;</li> <li>- main goals and objectives of information security.</li> </ul> <p>Can work in any operating system and with databases; apply methods and means of protecting information; work with spreadsheets, consolidate data, build charts.</p> <p>Have skills:</p> <ul style="list-style-type: none"> <li>- processing of vector and raster images;</li> <li>- creating multimedia presentations;</li> <li>- data visualization;</li> <li>- application of various forms of e-learning to expand professional knowledge;</li> <li>- work with cloud services of E-technologies.</li> </ul>	<p>Oral survey, testing, report, milestone control, calculation and graphic work</p> <p>Information and Communication technologies</p>	
GEM04 Physical training module	8	<p>Knows the main tasks of physical education of students, Can pass control exercises and standards.</p>	Physical education test	Physical Culture
GEM05 Research and Entrepreneurship Module	5	<p>Have an idea of the principles and patterns of economic relations.</p>	Oral survey, testing, report, milestone control, calculation and graphic work	Economic theory
	5	<p>Have the ability to make independent theoretical and practical judgments and conclusions. Be able to objectively evaluate scientific information, freedom of scientific research and the desire to apply scientific knowledge in educational activities, including for completing a diploma project (work).</p>	Oral survey, testing, report, midterm control, semester work	Research methodology based on artificial intelligence

	5	Have an understanding of the principles of law and anti-corruption culture	Oral survey, testing, report, midterm control, semester work	Fundamentals of law and anti-corruption culture
	5	Have an idea of the principles and laws of ecology and life safety	Oral survey, testing, report, midterm control, semester work	Fundamentals safety of life activity and ecology
	5	Have an idea of financial literacy	Oral survey, testing, report, midterm control, semester work	Basics of financial literacy
	5	Have an idea of IT competence and entrepreneurial skills	Oral survey, testing, report, midterm control, semester work	Startups and entrepreneurship using artificial intelligence
<b>BASIC MODULES</b>				
BM01 Physics and mathematics module	6, 5	Able to apply methods for solving differential and integral calculus of functions of several variables in applied problems; apply methods for solving differential equations in solving applied problems; obtain approximate values of solutions using expansion in power series and Fourier series with a given accuracy; determine the optimal methods for solving practical problems.	Oral survey, testing, report, midterm control, calculation and graphic work	Mathematical analysis 1, 2
	4	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.	Oral survey, testing, report, midterm control, semester work	Algebra and Geometry
	6	Study of discrete objects, solution of combinatorial problems, study of types of mappings and binary relations, reduction of propositional algebra formulas to normal forms, application of logical algebra to the theory of switching circuits. The ability to analyze and synthesize, as well as mathematical maturity.	Oral survey, testing, report, midterm control, calculation and graphic work	Discrete mathematics and mathematical logic



	3	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.	Oral survey, testing, report, midterm control, calculation and graphic work	Probability theory
	6	Knows modern statistical methods and economic theory.	Oral survey, testing, report, midterm control, calculation and graphic work	Statistics for data analysis
	6	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.	Oral survey, testing, report, midterm control, calculation and graphic work	Optimization methods in artificial intelligence
BM02 Mathematical modeling module	6	The course includes: Fundamentals of error theory, Systems of linear algebraic equations, Nonlinear equations and systems of nonlinear equations, Interpolation and best approximations, Differentiation and integration of functions, Ordinary differential equations, Equations of mathematical physics.	Oral survey, testing, report, midterm control, calculation and graphic work	Computational mathematics
BM03 Computer simulation module	6	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 survey, testing, report, midterm control, calculation and graphic work	Fundamentals of Programming
	5	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	Oral survey, testing, report, midterm control, calculation and graphic work	Object-oriented programming
	6	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 survey, testing, report, midterm control, calculation and graphic work	Algorithms and data structures

	5	Know the basics of machine learning theory, including discriminant, cluster and regression analysis, mastering the skills of practical solution of data mining problems.	Oral survey, testing, report, midterm control, calculation and graphic work	Fundamentals of Neural Networks and Machine Learning
	5	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 survey, testing, report, midterm control, calculation and graphic work	Database theory and design
	5	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.	Oral survey, testing, report, midterm control, calculation and graphic work	Multi-model artificial intelligence systems
	5	Knows how to apply technologies for designing the structure of a website as an information system	Oral survey, testing, report, midterm control, calculation and graphic work	WEB technology
	5	Knows how to apply programming skills to build predictive models, data visualization and work with neural networks.	Oral survey, testing, report, midterm control, calculation and graphic work	Python for data analysis
<b>PROFESSIONAL MODULES</b>				
PM01 Module of elective disciplines	5	Able to have professional skills	Oral questioning, testing, report, midterm control	Elective discipline No. 2 from CED
	5			Elective discipline No. 3 from CED
PM02 AI module	9, 5	The discipline is aimed at studying methods and models of deep learning, considers quantitative and qualitative areas of machine learning (Machine 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	Oral survey, testing, report, midterm control, projects	Deep Learning 1, 2



		recognition, natural language processing, audio recognition, bioinformatics and others.					
	5, 5	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).					Image Processing and Computer Vision I, II
	5	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
	5	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
	5	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
	5	The course "Software Project Management" 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
	5	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. 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.					Reinforcement Learning
PM03 Practice module	3	Knows the organizational structure and complex of technical means of the information and analytical center (IAC) of the organization.					Teaching practice
	6						

	5	<p>Able to identify the main problems solved by the IAC.</p> <p>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 materials necessary for writing a course work, scientific report and internship report.</p>		Pregraduation practice
PM04 Module of Minor disciplines	5, 5, 5	Able to apply acquired knowledge in the chosen additional educational program.	Oral questioning, testing, report, midterm control	Minor 1, 2, 3



## 3.4. 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
<b>Cycle of general education disciplines (GED)</b>						
<b>Required component (RC)</b>						
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		-	-
2.	Philosophy	This course consists of teaching philosophy to develop a conscious attitude towards the environment.	5		-	-
3.	Foreign language	This course consists of teaching a foreign language to develop communication skills in a foreign language.	10		-	
4.	Kazakh (Russian) language	This course consists of teaching the Kazakh / Russian language to develop communication skills in the state, Russian languages.	10			
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			
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			
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			
8.	Physical education	The course provides solutions to the main tasks of physical education of students, provides for passing control exercises and standards.	8			
<b>Cycle of general education disciplines (GED)</b>						
<b>University Component (UC) and/or Optional Component (OC)</b>						
9.	Elective discipline 1 (GED)		5	LO10 LO11		
	Economic theory	The purpose of the course is to study and explain the processes and phenomena of economic life, explain patterns and predict ways of using them.				
	Startups and entrepreneurship using artificial intelligence	This course is an introduction to what a business is, how it works and how to manage it. Students will identify forms of ownership and processes used in production and marketing, finance, personnel and management in business operations.				
	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 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 and ecology	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. Also 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.				
	Basics of financial literacy	The course "Basics of Financial Literacy" is aimed at gaining knowledge and skills in the field of personal finance management. As part of the course, students will learn to use in practice all kinds of tools in the field of finance, save and increase savings, plan a budget competently, gain practical skills in calculating and paying taxes and correctly filling out tax reporting, learn to analyze financial information and navigate financial products to choose an adequate investment strategy.				
	Research methodology based on artificial intelligence	The course is devoted to the study of activities aimed at developing in students the ability to make independent theoretical and practical judgments and conclusions, the ability to objectively evaluate scientific information, freedom of scientific research and the desire to apply scientific knowledge in educational activities, including for completing a diploma project (work).				
<b>Cycle of core disciplines University component</b>						
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	
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	4	LO2	-	Optimization meth



		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.				ods 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	Algebra and geometry, TV, 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, LO4	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 best approximations, Differentiation and integration of functions, Ordinary differential equations, Equations of mathematical physics.	6	LO2		ED from CED
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, LO8	Object-oriented programming	ED from CED
17.	WEB technology	This course teaches the basics of website development using HTML, Cascading Style Sheets (CSS), JavaScript, and JQuery. Teaches you how to use the PHP programming language, master MySQL database basics, and develop secure server-side client web applications.	5	LO1, LO4		
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, LO8	-	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	-	-
<b>Cycle of core disciplines</b>						
<b>Optional component</b>						
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	Statistics for

					analysis	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 systems within the framework of an interdisciplinary training program covering the section of modern statistical methods and economic theory.	6	LO9	Probability theory	Fundamentals of 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	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	LO3, LO8	Programming basics	Fundamentals 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.	2	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 LO8	Python for data analysis	Deep learning 1
28.	Multimodel artificial	The discipline "Multimodel Artificial Intelligence Systems" studies methods and technologies for complex analysis and processing of data from	5	LO7 LO8	Database theory	



	intelligence systems	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.			and design	
<b>Cycle of profiling disciplines University component</b>						
29.	Industrial practice	The practice includes the study of the organizational structure and complex of 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).	7	LO4, LO6	-	-
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	-	-
<b>Cycle of profiling disciplines Optional component</b>						
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.	7, 5	LO3, LO7-9		
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, LO8		
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	LO4, LO8		
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	LO6, LO8		
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, LO8		
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. It outlines the discipline of project management as a tool for creating high-quality products within a defined	5	LO6, LO8		

		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	LO3, LO8		
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.	2	LO5		
39.	Elective discipline 2	Students choose an elective	5	LO1, LO4		
	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.				
	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.				
	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.				
	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)				
40.	Elective discipline 3	Students choose an elective	5	LO1, LO8		
	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.				
	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.				
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	LO1, LO4, LO10		
42.	Minor 2					
43.	Minor 3					

## 4. Educational program curriculum

№	Module code	Module name in three languages (Kaz/Rus/Eng)	Discipline code	Name of the discipline in three languages (Kaz/Rus/Eng)	Cycle (GED, CD, PD)	Component (RC, OC, UC)	Total number of credits (ECTS)	Total academic hours	Number of classroom hours				Number of hours of SIS		Form of control (Att1, Att2, exam, CW/CP, differential test, defense of DP/DW)	Prerequisites (Discipline code)
									Total classroom hours	lectures	practical (sem.)	Laboratory	Total hours SIS	Including T SIS		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<b>I course</b>																
<b>I semester</b>																
1	GEM02	Тілдік дайындық / Языковая подготовка / Language training	LAN6001A	Шет тілі / Иностранный язык / Foreign language	GED	RC	5	150	45	0	45	0	105	15	Att1, Att2, exam	-
2	GEM01	Әлеуметтану және этика / Социология и этики / Sociology and Ethics	HK6002	Қазақстан тарихы / История Казахстана / History of Kazakhstan	GED	RC	5	150	45	15	30	0	105	15	Att1, Att2, exam	-
3	GEM03	Ақпараттық технологиялар модулі / Модуль информационных технологий / Information Technology Module	ICT6001	Ақпараттық-коммуникациялық технологиялар / Информационно-коммуникационные технологии / Information and Communication Technologies	GED	RC	5	150	45	15	0	30	105	15	Att1, Att2, exam	-
4	GEM01	Әлеуметтану және этика / Социология и этики / Sociology and Ethics	SPS6501	Әлеуметтану - Саясаттану / Социология-Политология / Sociology - Political science	GED	RC	4	120	45	15	30	0	60	15	Att1, Att2, exam	-
5	BM01	Физика - математикалық Модуль / Модуль Физико-математический / Physics and Mathematics module	MAT6501	Математикалық талдау 1 / Математический анализ 1 / Mathematical analysis 1	CD	UC	6	180	60	30	30	0	120	15	Att1, Att2, exam	-
6	BM01	Физика - математикалық Модуль / Модуль Физико-математический / Physics and Mathematics module	MAT6001	Алгебра және геометрия / Алгебра и геометрия / Algebra and Geometry	CD	UC	4	120	45	15	30	0	75	15	Att1, Att2, exam	-



7	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6001	Бағдарламалау негіздері / Основы программирования / Fundamentals of Programming	CD	UC	6	180	60	15	15	30	120	15	Att1, Att2, exam	-
8	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6558	WEB технологиялары / WEB технология / WEB technology	CD	UC	5	150	45	15	15	15	105	15	Att1, Att2, exam	-
<b>Total for the 1<sup>st</sup> semester:</b>																
<b>2 semester</b>																
9	GEM02	Тілдік дайындық / Языковая подготовка / Language training	L.AN6002A	Шет тілі / Иностраный язык / Foreign language	GED	RC	5	150	45	0	45	0	105	15	Att1, Att2, exam	-
10	GEM04	Дене шынықтыру модулі / Модуль физической подготовки / Physical training module	PHC6005	Дене шынықтыру / Физическая культура / Physical Culture	GED	RC	4	120	45	0	45	0	75	15	Att1, Att2, exam	-
11	BM01	Физика - математикалық Модуль / Модуль Физико-математический / Physics and Mathematics module	MAT6502	Математикалық талдау 2 / Математический анализ 2 / Mathematical analysis 2	CD	UC	5	150	45	15	30	0	105	15	Att1, Att2, exam	MA T65 01
12	BM01	Физика - математикалық Модуль / Модуль Физико-математический / Physics and Mathematics module	MAT6509	Дискреттік математика және математикалық логика / Дискретная математика и математическая логика / Discrete Mathematics and Mathematical Logic	CD	OC	6	180	60	30	30	0	120	15	Att1, Att2, exam	-
13	PM03	Тәжірибе модулі / Модуль практик / Practice module	PP6501	Оқыту практика / Учебная практика / Teaching practice	CD	UC	2	60	0	30	0	0	30	0	Diff. test	-
14	BM01	Физика - математикалық Модуль / Модуль Физико-математический / Physics and Mathematics module	MAT6520	Ықтималдық теориясы / Теория вероятности / Probability Theory	CD	OC	3	90	30	15	15	0	60	15	Att1, Att2, exam	-
15	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6544	Деректердік теориясы және жұбайлау / Теория и проектирование базы данных / Database theory and design	CD	OC	5	150	45	15	15	15	105	15	Att1, Att2, exam	SFT 650 1
16	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6517	Объекті-бағдарланған программалау / Объектно-ориентированное программирование / Object-oriented programming	CD	UC	5	150	45	15	15	15	105	15	Att1, Att2, exam	SFT 600 1
17	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6503	Деректерді талдауға арналған Python / Python для анализа данных / Python for Data Analysis	CD	OC	5	150	45	15	0	30	105	15	Att1, Att2, exam	SFT 651 6

		Total for the 2 <sup>nd</sup> semester:										40				
		TOTAL FOR THE 1 COURSE:										80				
		2 course														
		3 semester														
18	GEM02	Тілдік дайындық / Языковая подготовка / Language training	LAN6001K R	Казак (орыс) тілі / Казахский (русский) язык / Kazakh (Russian) language	GED	RC	5	150	45	0	45	0	105	15	Att1, Att2, exam	-
19	GEM04	Дене шынықтыру модулі / Модуль физической подготовки / Physical training module	PhC6006	Дене шынықтыру / Физическая культура / Physical Culture	GED	RC	4	120	45	0	45	0	75	15	Att1, Att2, exam	-
20	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6501	Алгоритмдер және деректер құрылымы / Алгоритмы и структуры данных / Algorithms and data structures	CD	UC	5	150	45	15	15	15	105	15	Att1, Att2, exam	SFT 651 7
21	BM02	Математикалық модельдеу модулі / Модуль математического моделирования / Mathematical modeling module	MAT6504	Есептеу математикасы / Вычислительная математика / Computational mathematics	CD	UC	6	180	60	15	15	30	120	15	Att1, Att2, exam	MA T65 31
22	PM02	Деректерді талдау модулі / Модуль Анализа данных / Data Analysis Module	MAT6507	Деректерді талдауға арналған статистика / Статистика для анализа данных / Statistics for data analysis	CD	OC	6	180	60	30	30	0	120	15	Att1, Att2, exam	MA T65 20
23	GEM02	Тілдік дайындық / Языковая подготовка / Language training	LAN6002P A	Қасиби бағытталған шет тілі / Профессионально-ориентированный иностранный язык / Professionally oriented foreign language	CD	OC	4	120	45	0	45	0	75	15	Att1, Att2, exam	-
24	BM03	Компьютерлік модельдеу модулі / Модуль компьютерного моделирования / Computer simulation module	SFT6546	Нейрондық желілер және машиналық оқыту желілері / Основы нейронных сетей и Машинное обучение / Fundamentals of Neural Networks and Machine Learning	CD	OC	5	150	45	15	0	30	105	15	Att1, Att2, exam	SFT 650 3
25	PM01	Электрлі пәндер модулі / Модуль электривных дисциплин / Module of elective disciplines	SFT6525	Android үшін мобилалық қосымшаларды әзірлеу / Разработка мобильных приложений на Android / Mobile application development on Android	PD	OC	5	180	60	15	15	30	120	15	Att1, Att2, exam	MA T65 06
			SFT6515	iOS үшін мобилалық қосымшаларды әзірлеу / Разработка мобильных приложений на iOS / Mobile application development on iOS												



		Total for the 3 <sup>rd</sup> semester:										40												
		4 semester																						
26	GEM02	Тілдік дайындық / Языковая подготовка / Language training	LAN6002K R	Казак (орыс) тілі / Казахский (русский) язык / Kazakh (Russian) language	GED	RC	5	150	45	0	45	0	105	15									Att1, Att2, exam	-
27	GEM01	Әлеуметтану және этика / Социология и этики / Sociology and Ethics	SPS6502	Әлеуметтану және психология / Культурология и психология / Cultural studies and Psychology	GED	RC	4	120	45	15	30	0	105	15									Att1, Att2, exam	-
28	GEM05	Зерттеу және кәсіпкерлік модулі / Модуль исследований и предпринимательства / Research and Entrepreneurship Module	RM6503	Жаңа ғылымдар институтының зерттеу әдіснамасы / Методология исследования на основе искусственного интеллекта / Research methodology based on artificial intelligence	GED	OC	5	150	45	15	30	0	105	15									Att1, Att2, exam	-
			JUR 6507	Тіршілік қауіпсіздігінің және экологияның негіздері / Основы экологии и безопасности жизнедеятельности / Fundamentals safety of life activity and ecology																				
			JUR 6470	Заң және сыбайлас жемқорлыққа қарсы мәдениеттің негіздері / Основы права и антикоррупционной культуры / Fundamentals of law and anti-corruption culture																				
			MGT6501	Жаңа ғылымдар институтының стартаптар мен кәсіпкерлік / Стартапы и предпринимательство с использованием искусственного интеллекта / Startups and entrepreneurship using artificial intelligence																				
			FIN6720	Қаржылық сауаттылықтың негіздері / Основы финансовой грамотности / Basics of financial literacy																				
			ECC6006	Экономикалық теория / Экономическая теория / Economic theory																				
29	PM02	ЖИ модулі / Модуль ИИ / AI module	SFT6547	Бағдарламалық жасақтаманың жобаларды басқару / Управление разработкой программного обеспечения / Software Project Management	PD	OC	5	150	45	15	15	15	105	15									Att1, Att2, exam	

30	PM03	Тэжрибе модулі / Модуль практик / Practise module	PP6502	Өндірістік практика / Производственная практика / Industrial practice	PD	UC	7	210	0	0	0	0	0	0	0	0	0	0	0	Report	-
31	PM02	ЖИ модулі / Модуль ИИ / AI module	SFT6554	Терең оқыту I / Глубокое обучение I / Deep Learning I	PD	OC	7	210	75	30	0	45	135	15	15	15	15	15	15	Att1, Att2, exam	-
32	PM04	Майнор пәндер модулі / Модуль Майнор дисциплин / The module of Minor disciplines	MIN601	Майнор 1 / Майнор 1 / Minor 1	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-
33	PM02	ЖИ модулі / Модуль ИИ / AI module	SPS6501	ЖИ этика / Этика ИИ / Ethics of AI	PD	OC	2														
				<b>Total for the 4<sup>th</sup> semester:</b>			<b>40</b>														
				<b>TOTAL FOR THE 2 COURSE:</b>			<b>80</b>														
<b>3 course</b>																					
<b>5 semester</b>																					
34	GEM01	Әлеуметтану және этика / Социология и этики / Sociology and Ethics	SPS6001	Философия / Философия / Philosophy	GED	RC	5	150	45	15	30	0	105	15	15	15	15	15	15	Att1, Att2, exam	-
35	PM02	ЖИ модулі / Модуль ИИ / AI module	SFT6556	Кескіндерді өңдеу және компьютерлік көру I / Обработка изображений и компьютерное зрение I / Image Processing and Computer Vision I	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-
36	PM02	ЖИ модулі / Модуль ИИ / AI module	SFT6567	Жүйелік дизайн / Системный дизайн / System Design	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-
37	PM02	ЖИ модулі / Модуль ИИ / AI module	SFT6583	НЛБ және жедел басқару / НЛП и оперативный менеджмент / NLP and Prompt Management	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-
38	PM02	ЖИ модулі / Модуль ИИ / AI module	MAT6555	Жасанды интеллектті оптимизация әдістері / Методы оптимизации в искусственном интеллекте / Optimization methods in artificial intelligence	CD	UC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-
39	PM02	ЖИ модулі / Модуль ИИ / AI module	SFT6555	Терең оқыту II / Глубокое обучение II / Deep Learning II	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-
40	PM04	Майнор пәндер модулі / Модуль Майнор дисциплин / Module of Minor disciplines	MIN602	Майнор 2 / Майнор 2 / Minor 2	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	MI N60 I
41	PM01		SFT6584	Робототехника / Робототехника / Robotics	PD	OC	5	150	45	15	15	15	105	15	15	15	15	15	15	Att1, Att2, exam	-








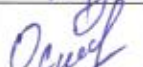



## 5. Additional educational programs (Minor)

Name of AEP (Minor), indicating the list of disciplines that form Minor	Number of credits for AEP / number of credits for discipline	Semester of training	Document issued based on the results of mastering the AEP (Minor)
Data protection			
SEC6206 Cryptographic methods of information protection	5	5	Transcript
SEC6211 Protecting Database Management Systems	5	6	Transcript
SEC6236 Protecting applications and scripts from modifications	5	7	Transcript
Accounting by ACCA			
ACC6701 Business technology (ACCA)	5	5	Transcript
ACC6702 Financial Accounting	5	6	Transcript
ACC6703 Management Accounting	5	7	Transcript
Management & Leadership			
MGT6701 Management	5	5	Transcript
MGT6707 Psychology of Management	5	6	Transcript
MGT6702 Organizational Behavior and Leadership	5	7	Transcript
IoT Security Technologies			
HRD6202 IoT Technologies	5	5	Transcript
SEC6215 IoT Security	5	6	Transcript
SEC6235 Biometric access control systems	5	7	Transcript

**6. Agreement sheet with developers**

Code and name of the educational program: 6B06120 «Artificial Intelligence».

№	Developers of the educational program (Position, academic degree, full name)	Data	Signature	Note
1	Assistant-professor, PhD Ydyrys A.Zh.	19.03.24		
2	Associative professor, PhD Omarov B.S.	19.03.24		
3	Associative professor, PhD Nurtas M.	19.03.24		
4	Senior-lecturer, Olzhayev O.M.	19.03.24	