Ministry of Science and Higher Education of the Republic of Kazakhstan
Korkyt Ata Kyzylorda University
Institute of Artificial Intelligence

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GRADUATE PROFILE
Bachelor of the Joint Educational Program with Seoul National University of Science and Technology
"6B06102 – Computer Software and Programming"

Kyzylorda, 2024

CONTENTS

INTRODUCTION

The graduate profile of Korkyt Ata Kyzylorda University represents a comprehensive learning outcome across all levels of education offered by the university. It serves as a guideline for developing educational programs.

Creating a competency-based graduate profile is a crucial requirement for implementing the core objectives of the Bologna Process and addressing the needs of the modern labor market. The competency model of a graduate (bachelor) is designed to answer the question of which professional tasks a specialist of a certain rank and profile should be able to solve. Developing a modern graduate profile that meets the expectations of all stakeholders is a primary strategic goal of Korkyt Ata Kyzylorda University. This goal is supported by the necessary resources for the educational process, including staffing, methodological, informational, and material and technical resources.

DESCRIPTION OF THE EDUCATIONAL PROGRAM

The educational program 6B06103 – Computer Programming and Software Development is aimed at training specialists proficient in modern programming languages, methods of software development and maintenance, with an emphasis on artificial intelligence technologies. The program considers labor market demands and focuses on creating professionals capable of developing innovative solutions at the intersection of traditional programming and advanced AI technologies.

The primary goal of the program is to develop professional competencies in graduates for designing, developing, testing, and optimizing software solutions using modern programming technologies and artificial intelligence.

KEY COMPONENTS IN DEVELOPING THE GRADUATE PROFILE OF THE EDUCATIONAL PROGRAM

2.1 Objectives of the Educational Program:

- Training specialists in the development, testing, and maintenance of software products utilizing artificial intelligence technologies.
- Teaching modern programming languages, tools, and technologies to create intelligent solutions.
- Developing competencies for integrating AI models and systems into the software development process.

2.2 Tasks of the Educational Program:

- Mastering modern programming languages (Python, Java, C#, JavaScript) and AI development frameworks (TensorFlow, PyTorch).
- Learning the principles of software architecture design and the implementation of machine learning algorithms.
- Building skills in working with databases, cloud platforms, and APIs to create intelligent systems.
- Developing and optimizing software with integrated AI models.
- Creating mobile and web applications with AI functionality (e.g., image recognition systems, chatbots).
- Implementing CI/CD and DevOps approaches to support intelligent solutions.

2.3 General and Professional Competencies

General Competencies:

- Proficiency in the basics of mathematical modeling and technical analysis.
- Ability to solve software development and AI-related problems using a scientific approach.
- Skills to work effectively in a team and take on leadership roles in projects.
- Critical thinking and problem-solving skills for non-standard situations.
- Knowledge of project management principles and Agile/Scrum methodologies.

Professional Competencies:

- Development of software using modern programming languages and frameworks.
- Design and implementation of machine learning models for data automation and analysis.
- Creation of intelligent systems and integration of AI-based solutions into business processes.
- Testing and optimization of software, including AI functionality, to enhance performance.
- Working with databases (SQL, NoSQL) and cloud services for implementing AI projects.
- Development of mobile and web applications with integrated machine learning and neural networks.
- Implementation of CI/CD and DevOps practices to support intelligent software solutions.
- Utilization of version control systems (Git) for collaborative development and project management.

1.3 Matrix of Correlation Between Educational Program Learning Outcomes and Developed Competencies

Competencies	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
GC 1	+						
GC 2	+						
GC 3	+						
GC 4	+						

GC 5							
GC 6							
GC 7	+						
GC 8							
GC 9							
GC 10	+						
GC 11							
GC 12	+						
GC 13							+
SC 1			+				
SC 2	+						
SC 3			+				
SC 4			+				
SC 5	+						
SC 6		+					
SC 7							
SC 8		+					
SC 9	+						
SC 10			+				
SC 11				+			
SC 12				+			
SC 13	+						
SC 14					+		
SC 15			+				
SC 16		+					
SC 17		+					
SC 18							+
SC 19				+			
SC 20			+				
SC 21						+	
SC 22		+					
SC 23				+			
SC 24				+			
SC 25				+			
SC 26					+		
SC 27							+
SC 28				+			
SC 29				+			
SC 30							+
PC 1		+					
PC 2						+	
PC 3				+			
PC 4				+			
PC 5				+			
PC 6					+		

PC 7						+	
PC 8					+		
PC 9				+			
PC 10							+

PO 1	Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
PO 2	Knows basics of IT-infrastructure, network and data transmission principles. Can analyze and design electrical circuits and industrial networks. Possesses in programs in C++ and Python.
PO 3	Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
PO 4	Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling.
PO 5	Knows principles of human-computer interaction and robotics. Develops and analyzes AI, computer vision, and deep learning algorithms. Proficient in developing interfaces, and creating robotic systems.
PO 6	Knows methods of data collection, processing, and analysis, and principles of software design. Analyzes big data using efficient data structures. Proficient processing optimizing technologies in software solutions.
PO 7	Knows basics of labor protection and law, anti-corruption culture, environmental standards, assesses

2.5 Personal Qualities of a Specialist in Computer Programming and Artificial Intelligence:

- Logical and algorithmic thinking.
- Ability to integrate AI technologies into solutions for real-world tasks.
- Creativity and proficiency in working with innovative technologies.
- Attention to detail and accuracy in programming code development.
- Independence and responsibility in completing assigned tasks.
- Capability for self-learning and mastering new technologies in the field of AI.
- Skills in effectively distributing tasks within a team.
- Stress tolerance and ability to work in multitasking environments.
- Initiative and ambition to implement advanced AI solutions in software development.

CONCLUSION

The graduate profile of the educational program "Computer Programming and Software Development" ensures the acquisition of essential knowledge, skills, and competencies for successful professional activity in software development and artificial intelligence. Graduates gain practical experience in creating intelligent software solutions and adapting to the demands of the modern digital economy. The university continues to enhance its educational programs by incorporating the latest technologies and methodologies to train highly sought-after specialists for the labor market.

Appendix 1

Competency-Based Graduate Profile

Module	DDB (Dublin Descriptors for Bachelor's Degree)	Developed Competencies			Planned Learning Outcomes
		General Education Competencies	Basic Competencies	Specialized Competencies	
1	2	3	4	5	6
M1	DDB1 DDB 2 DDB3 DDB4 DDB5	GC 1	SC 2		PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 2	SC 5		PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 3	SC 9		PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 4	SC 13		PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 5			PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 6			PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 7			PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1	GC 9			PO 1

	DDB2 DDB3 DDB4 DDB5				Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes.
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 10			PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 11			PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes
	DDB1 DDB2 DDB3 DDB4 DDB5	GC 12			PO 1 Fluent in foreign languages (English and Korean), with skills in intercultural interaction and evaluating social processes
M2	DDB1 DDB2 DDB3 DDB4 DDB5		SC 7		PO 2 Knows basics of IT-infrastructure, network and data transmission principles. Can analyze and design electrical circuits and industrial networks. Possesses in programs in C++ and Python.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 8		PO 2 Knows basics of IT-infrastructure, network and data transmission principles. Can analyze and design electrical circuits and industrial networks. Possesses in programs in C++ and Python.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 17		PO 2 Knows basics of IT-infrastructure, network and data transmission principles. Can analyze and design electrical circuits and industrial networks. Possesses in programs in C++ and Python.
M3	DDB1 DDB2 DDB3 DDB4 DDB5		SC 1		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 3		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 4		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 10		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.

	DDB1 DDB2 DDB3 DDB4 DDB5		SC 15		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 18		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 20		PO 3 Knows the basics of algebra and calculus, including mathematics, physics, and probability theory. Applies mathematical methods in physics and discrete mathematics to solve problems using discrete structures and algorithms.
M4	DDB1 DDB2 DDB3 DDB4 DDB5		SC 6	PC 1	PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 11	PC 3	PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 12	PC 4	PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 16	PC 5	PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 19		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 22		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2		SC 23		PO 4

	DDB3 DDB4 DDB5				Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 23		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 24		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 27		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 28		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 29		PO 4 Knows operating systems, control theory, computer systems architecture, information security, system programming, and software development. Proficient in object-oriented programming with C#, network systems, and ICT modeling
M5	DDB1 DDB2 DDB3 DDB4 DDB5		SC 14	PC 6	PO 5 Knows principles of human-computer interaction and robotics. Develops and analyzes AI, computer vision, and deep learning algorithms. Proficient in developing interfaces, and creating robotic systems.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 26	PC 8	PO 5 Knows principles of human-computer interaction and robotics. Develops and analyzes AI, computer vision, and deep learning algorithms. Proficient in developing interfaces, and creating robotic systems
	DDB1 DDB2 DDB3 DDB4 DDB5			PC 9	PO 5 Knows principles of human-computer interaction and robotics. Develops and analyzes AI, computer vision, and deep learning algorithms. Proficient in developing interfaces, and creating robotic systems
	DDB1 DDB2 DDB3 DDB4			PC 10	PO 5 Knows principles of human-computer interaction and robotics. Develops and analyzes AI, computer vision, and deep learning algorithms. Proficient in

	DDB5				developing interfaces, and creating robotic systems
M6	DDB1 DDB2 DDB3 DDB4 DDB5		SC 21	PC 2	PO 6 Knows methods of data collection, processing, and analysis, and principles of software design. Analyzes big data using efficient data structures. Proficient processing optimizing technologies in software solutions.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 25	PC 7	PO 6 Knows methods of data collection, processing, and analysis, and principles of software design. Analyzes big data using efficient data structures. Proficient processing optimizing technologies in software solutions.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 26		PO 6 Knows methods of data collection, processing, and analysis, and principles of software design. Analyzes big data using efficient data structures. Proficient processing optimizing technologies in software solutions.
	DDB1 DDB2 DDB3 DDB4 DDB5		SC 29		PO 6 Knows methods of data collection, processing, and analysis, and principles of software design. Analyzes big data using efficient data structures. Proficient processing optimizing technologies in software solutions.
M7	DDB1 DDB2 DDB3 DDB4 DDB5	GC 13	SC 30		PO 7 Knows basics of labor protection and law, anti-corruption culture, environmental standards, assesses economic risks. Proficient in project management methods in R&D and IT

M1 - Socio-Cultural Knowledge
M2 - Propaedeutics
M3 - Basic Knowledge
M4 - Fundamental Knowledge
M5 - Social Methods and Technologies
M6 - Social Models
M7 - Science, Innovation, and Educational Work
M8 - Final Attestation