AGREED
Executive director of
«Internet Society Kazakhstan» PO
_____ Nurlybayev T.A.
«___» _____2023

APPROVED
Rector
of JSC «International Information Technology University»
_____ Hikmetov A.U.
«30» 03 2023

EDUCATIONAL PROGRAM

6B06110 « Software Engineering»

Code and classification of the field of education: 6B06 – Information and Communication Technology

Code and classification of training area: 6B061 – Information and Communication Technology

Group of educational programs: B057 – Information Technology

ISCED level: 6

NQR level: 6

ORC level: 6

Duration: 4 years

Number of credits: 240

AGREED
Director of
«KnewIT Programming School» LLC
_____ Bekaulov N.M.
«___» _____2023

AGREED
Executive director of
«KazREENA Association» ALE
_____ Tatybayev S.K.
«___» _____2023

Almaty, 2023

Content

List of abbreviations and notation

BC	Basic competence
BM	Base module
HE	Higher education
SCES	State compulsory education standard
EQF	European qualification framework
EEF	European Education Foundation
KSC	Knowledge, skills, cum-savvy
NCO	National Classification of Occupations
NQF	National Qualifications Framework
NQS	National qualifications system
HM	Humanitarian module
CM	Common module
EP	Educational program
GPM	General Professional Module
IQF	Industry Qualifications Framework
PS	Professional standard
PE	Postgraduate education
PC	Professional competence
PM	Professional module
SW	Software
WG	Working group
RK	The Republic of Kazakhstan
LO	Learning outcome
SM	Special module
QMS	Quality Management System
SEM	Socio-economic module
TVE	Technical and vocational education
TaVPE	Technical and vocational education and post-secondary education
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO	Specialized agency of the United Nations Educational, Scientific and Cultural Organization
Cedefop	European Center for Development of Vocational Training
DACUM	from Eng. Developing curriculum
ECVET	European Credit System for vocational education and training
EQAVET	European Quality Assurance in Vocational Education and Training
ENQA	European Association for Quality Assurance in Higher Education / Europe-Skye association by to ensure qualities at higher education
ESG	Standards and Guidelines for Quality Assurance in the European Higher Education Area
FIBAA	International Agency (non-profit foundation) for accreditation and examination of the quality of higher education (Bonn, Germany)
IQM-HE	Internal Quality Management in Higher Education
TACIS	Technical Assistance for the Commonwealth of Independent States
WSI	WorldSkills International

1 Description of the educational program

The educational program 6B06110 Software engineering» is designed to implement the principles of a democratic nature of educational management, expanding the boundaries of academic freedom and the authority of educational institutions, which will ensure the adaptation of the technical and vocational education system to the changing needs of society, the labor market economy. The flexibility of the program will allow you to take into account the abilities and needs of the individual, production and society.

The educational program ensures the application of an individual approach to students, ensures the transformation of professional competencies from professional standards and qualification standards into learning outcomes. Provides student-centered learning - the principle of education, involving a shift in emphasis in the educational process from teaching to learning.

The educational program «Computer Systems and Software Engineering» prepares specialists of a wide profile in the field of software development for any areas of human activity. Preparation for this educational program includes disciplines that form competencies in the field of data analysis and machine learning, network technologies, robotic systems and graphic computing.

The area of professional activity of graduates is state and private enterprises and organizations that develop, implement and use computer hardware and software in various fields, namely: telecommunications, science and education, healthcare, agriculture, mechanical engineering, metallurgy, transport, services, administrative management, economics, business, various technology management, etc.

2 The goal and objectives of the educational program

The goal of the EP – is to provide practice-oriented training of highly qualified specialists in software development in various fields with competencies in the field of data analysis, network technologies, robotics and graphic computing.

The objectives of the EP:

1. To prepare a universal specialist who has knowledge in mathematics, ICT, computer sciences; able to use modern information and communication technologies in substantive activities.
2. To teach students how to formalize the subject area of a software project and develop specifications for software product components.
3. To develop the ability to design software architecture and provide a high level of continuity and quality of complex software development.
4. To teach students to design and develop user interfaces, commercial software components, databases and embedded software modules.
5. To acquaint students with the methods and tools for researching software code to identify / eliminate errors and malfunctions in the software.
6. To provide knowledge to students on the design of logical database schemes using relational, object-oriented, object-relational, key-value schemes for simple and complex defined systems.
7. To acquaint students with data analysis methods and machine learning algorithms for their application in various fields of human detail.
8. To develop students' skills in developing multi-robotic systems using artificial intelligence, sensory technologies, IoT, etc.
9. To train students in network technologies to configure networks of various sizes, prevent threats and troubleshoot.
10. To acquaint students with advanced technologies of three-dimensional visualization.

3 Requirements for the results of the mastering of the educational program

The following examination forms are used as an assessment of learning outcomes: computer testing, a written exam (answers on the sheets), an oral exam, a project (passing a course project), practical (open questions on a computer, solving problems on a computer, including in ACM format) comprehensive (test / written / oral + others). In accordance with table 1, the following exams are recommended:

Table 1

№	Exams form	Recommended share, %
1	Test	10%
2	Written	10%
3	Oral	5%
4	Project	30%
5	Practical	30%
6	Complex	15%

Final attestation is help on the form of defending a diploma project.

4 Passport of the educational program

4.1 General information

№	Field name	Note
1	Code and classification of the field of education	6B06 – Information and Communication Technology
2	Code and classification of training areas	6B061 – Information and Communication Technology
3	Group of educational programs	B057 – Information Technology
4	Name of the educational program	6B06110 Software engineering
5	Short description of the program	The educational program Software engineeringprepares specialists of a wide profile in the field of software development for any areas of human activity. Preparation for this educational program includes disciplines that form competencies in the field of data analysis and machine learning, network technologies, robotic systems and graphic computing.
6	Purpose of EP	To provide practice-oriented training of highly qualified specialists in software development in various fields with competencies in the field of data analysis, network technologies, robotics and graphic computing
7	ISCED level	6
8	NQF level	6
9	IQF level	6
10	List of competencies : GC1: To know: socio-ethical values based on public opinion, traditions, customs, social norms and focus on them in their professional activities; history, 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 the social development of society; the basics of physical culture and the principles of a healthy lifestyle. GC2: To be capable of written and oral communication, including professional in the state language, the language of interethnic communication and English; ability is logically true,	

	reasoned and clearly build oral and written speech. BC1: To be competent in the choice of mathematical modeling methods for solving specific engineering problems, including the willingness to identify the natural science essence of the problems arising in the process of professional activity, and the ability to attract the appropriate physical and mathematical apparatus for its solution. BC2: The ability to use modern information and communication technologies in substantive activities, to analyze information sources. BC3: The ability to analyze the architecture of computer systems, the main components of a computer. PC1: The ability to formalize the subject area of a software project and develop specifications for software product components. PC2: The ability to design and develop user interfaces, commercial software components, databases and embedded software modules. PC3: To be competent in choosing software, DBMS, programming language. PC4: The ability to manage the software development process, the development team, as well as evaluate the economic efficiency of the project. PC5: The ability to design, configure, operate computer systems and networks. PC6: The ability to analyze various types of data, apply knowledge extraction methods. PC7: The ability to design, develop and operate robotic systems. PC8: The ability to develop three-dimensional visualizations using modern technologies.	
11	Learning outcomes. Students will be able to: LO1: Demonstrate the ability to use basic math tools to solve professional problems. LO2: Analyze the structure of the main components of the computer, use a wide range of technologies of internal and external memory; write program code for manipulating bits in the processor. LO3: Apply suitable data structures and develop appropriate algorithms for solving various computational problems. LO4: Apply various tools for software development, user interface, storage and data processing systems. LO5: Use various software development methodologies, draw up software documentation using the required diagrams, develop models of the logical and physical architecture of the software system, database, and manage the development process. LO6: Develop effective data storage systems and methods for their processing and analysis using machine learning algorithms. LO7: Own technologies for administering systems and networks of any configuration, troubleshooting and threat prevention. LO8: Design, operate and maintain robotic systems. LO9: Demonstrate the skills to develop complex three-dimensional visualizations using computer vision technologies, augmented and virtual realities. LO10: Independently critically analyze modern sources, draw conclusions, argue them and make decisions based on information.	
12	Form of study	Full-time
13	Language of instruction	English
14	Number of credits	240 ECTS credits
15	Awarded academic degree	Bachelor in Information and Communication Technology in educational program 6B06110 Software engineering
16	Developers and authors:	«International Information Technology University» JSC, Computer Engineering and Information Security Department: - Chinibayeva T.T., PhD, head of the «CEIS»

		department, Assistant prof., - Tokanov O.S., MSc, senior lecturer

4.2 Matrix of correlation of learning outcomes of the educational program with competencies

	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10
BC1	V									
BC2										V
BC3		V								
PC1					V					
PC2			V	V		V				
PC3			V	V						
PC4					V					
PC5							V			
PC6						V				
PC7								V		
PC8									V	

4.3 Information about courses

№	Name of the course	Short description of the course	Number of credits	Formed competencies (codes)
General disciplines (GD)				
Mandatory component (MC)				
1	HK6002 History of Kazakhstan	The laws of the historical process, the place of man in the historical process are studied. Historical knowledge is given about the main stages of development of modern Kazakhstan; focuses on the problems of historical and cultural processes and the development of Kazakhstan.	5	GC2 KC8
2	SPS6001 Philosophy	Studying the principles of understanding philosophy as a methodology of human activity, the main directions and problems of the world. The formation of a holistic vision of philosophy as a special form of knowledge of the world, its main problems and methods of studying them in the context of future professional activity.	5	GC2 KC8
3	LAN6001A, LAN6002A Foreign language	Written and oral communication skills in English are taught.	10	GC3, KC8
4	LAN6001KR, LAN6002KR Kazakh (Russian) language	The skills of written and oral communication in the state language (the language of interethnic communication) are inculcated.	10	GC3 KC8
5	ICT6001 ICT	The skills of applying information and communication technologies in substantive activities are taught.	5	KC1 GC1
6	SPS6003 Political science	The fundamentals of global political processes and the laws of political life are being studied.	2	GC2 KC8
7	SPS 6002 Sociology	The development of sociological imagination, understanding of sociology as a science. The study of sociological subject areas, directions and research methods. The basic concepts of sociological theories are discussed, as well as how society and social processes determine our life.	2	GC2 KC8
8	SPS6005 Psychology	The course is aimed at teaching students of non-psychological specialties. The basics of psychological science are considered, including topics such as an introduction to psychology, activity psychology, cognitive processes, personality psychology.	2	GC2 KC8
9	SPS6004 Cultural studies	The course is aimed at implementing fundamental ideas for the preservation of the cultural heritage of Kazakhstanis and the national code in the context of globalization, the modernization of public consciousness and human spirituality in the process of developing national art and cultural institutions.	2	GC2 KC8
10	PhC6005 Physical Culture	The ability to understand the practical use of healthy living standards, including prevention issues, is being instilled.	8	GC2
University component (UC)				
11	ECO6002 Economics and organization of production	New trends in the economy and organization of production are discussed with examples from real life and practice. The structure of the national economy, the enterprise and the organization of its production, capital and property of enterprises, material resources, wages and costs of production, income, profit, profitability, competitiveness, economic efficiency of production are considered.	5	KC2
12	MAT6001** Algebra and geometry	Studying the elements of linear algebra and analytic geometry using real life and various science examples.	4	KC2
13	MAT6002 Mathematical analysis	We consider such concepts as limits and differentiation of functions of one variable, indefinite and definite (Riemannian) integrals of functions with applications, as well as an introduction to topics	6	KC2

		related to ordinary differential equations.		
14	PHY6001 Physics	Studying the basic laws of classical mechanics, electricity, magnetism, thermodynamics, quantum mechanics, special relativity in search of ways to solve physical problems.	4	KC2
15	MAT6005 Discrete math	The study of discrete objects, the solution of combinatorial problems, the study of types of mappings and binary relations, the reduction of propositional algebra formulas to normal forms, the application of logic algebra to the theory of switching circuits. The capabilities for analysis and synthesis, and mathematical maturity are developing.	4	KC2
16	SFT6322 Introduction of artificial intelligence	The course will cover basic machine learning algorithms such as regression, classification, clustering, and neural networks, as well as deep learning and natural language processing technologies.	5	KC3
17	SFT6301 Algorithmization and programming	More complex, advanced algorithms and data structures using the C ++ programming language are considered.	6	KC3
18	MAT6006 Probability theory and mathematical statistics	The course focuses on the probability and statistics of any events, as well as on the relationship between mathematics and programming through an interdisciplinary training program that deepens the mathematical understanding of probability and develops the skills of logical and algorithmic thinking.	4	KC2
19	EGR6302 Information theory	Information theory is a branch of applied mathematics and computer science involving the quantification of information. The aim of course is to form a system of knowledge on the basics of information theory and its application to the practice of modern information systems. Objectives of the course: concept and types of information systems, the concept of entropy and ways of its assess, the concept of information, ways of quantify the information, theoretical and practical aspects of efficient coding, theoretical and practical aspects of noiseless coding, data transfer systems, modulation and demodulation.	5	KC2
20	SFT6002 Object oriented programming	The course is devoted to the principles of object-oriented programming using C ++ and the GUI part of the QT library. Topics covered are classes and objects, inheritance, and polymorphism. We study all the basic concepts of GUI programming in the QT library.	6	KC3
21	SFT6302 Algorithms and data structures	The principles of algorithm development, analysis of algorithms and fundamental data structures are considered. The emphasis is on choosing appropriate data structures and developing effective and correct algorithms for their implementation. Important elements of the course are measuring the performance and effectiveness of programs when comparing and comparing the results of small programs written in different languages.	4	KC3 KC5 KC7
22	LAN6007K Business correspondence in the state language	Business language skills are taught. The formation and development of listening, speaking, reading and writing skills on topics related to professional activities, as well as the development of social skills such as presentations.	2	GK3 KC8
23	PP6301 Educational practice	The acquisition of primary professional skills and the consolidation of skills by independently solving the problems of algorithmization, design and practical implementation of programs using modern programming technologies.	2	KC1 KC3
24	RM6301 Research fundamentals	Studying the issues of practical organization of scientific research, analysis and generalization of research results, mastery of the theory of engineering decision making, the basics of project management, requirements analysis, architecture development, detailed design, development of user interfaces and testing methods.	4	KC2
25	Parallel programming	The course "Parallel Programming" is intended for those who want to learn how to create and optimize parallel programs. The course will cover the basic concepts of parallel programming, such as multithreading, parallelization of computations, thread synchronization, etc.	6	KC3

26	SFT6305 Database design. Introduction to SQL	During the course, students will learn how to create relational databases, going through all the stages of the database design process (conceptual, logical and physical). In the second part of the course, students will learn the basics of Structured Query Language (SQL).	6	KC3 KC7
27	NET6301 Introduction to computer networks	Acquaintance with the basic network concepts and technologies, as well as developing the skills of planning and implementing small networks. The architecture, structure, functions, components and models of the Internet and other computer networks are considered. The principles and structure of IP addressing, as well as the basics of Ethernet concepts, media and operations, are presented as the basis for the curriculum.	4	KC1 KC2 KC3
28	SFT6304 Programming in Python	Familiarity with the Python programming language and its libraries. The emphasis is on procedural programming, non-strict types of variables, designing algorithms, working forms of applications (libraries), object-oriented programming, creating web and database applications, as well as data preprocessing.	5	KC3
29	SFT6306 Software architecture and design	The study of large systems and how they are decomposed into subsystems and components. Various notations and formalisms, detailed design and architecture are considered. The use of various notation with an emphasis on UML is explored. The role of architecture and detailed project specifications are considered in terms of risk management.	4	KC3 KC4 KC7
30	ANL6301 Introduction to data science	A basic understanding of machine learning and statistics. Studying data science methodology, open source tools for data science, the basics of mathematical statistics needed for machine learning. Constructing and testing hypotheses. The use of simple predictive models.	6	KC3 KC4 KC7
31	SEC6301 Fundamentals of information security	It covers basic security concepts, principles and technologies, cryptography, attack methods and security monitoring. Studying basic security methods for searching for threats on the network using various popular security tools in a real network infrastructure.	4	KC1 KC8
32	SFT6307 Web technologies	Learning the basic web technologies for front-end and back-end development using modern languages, tools and frameworks.	7	KC3 KC7
33	PM6301 Project management	Learning the basics of project management and the necessary steps to ensure successful project management. Studying the main characteristics of project management and various roles in the project to ensure success. Application of key skills to the project to evaluate, plan and develop control mechanisms.	4	KC3 KC4 KC6 KC7
34	LAN6003PA Professionally-oriented foreign language	Business English skills are taught. The formation and development of listening, speaking, reading and writing skills in English on topics related to professional activities, as well as the development of social skills such as presentations.	4	GK3 KC8
35	PP6302 Industrial practice	The consolidation of theoretical knowledge and the acquisition of practical skills in enterprises.	4	KC1 KC3
36	PP6303 Industrial practice	Systematization, consolidation and expansion of theoretical knowledge, development of practical skills, mastery of the elements of independent practical and research work in enterprises.	4	KC1 KC3
37	PP6304 Pre-diploma practice	Search for information for writing the diploma project	5	KC2
Elective courses (EC)				
38	SFT6309 UX/UI development	The course introduces students to the concept of designing systems that can effectively interact with people. Students will learn the principles of design and human behavior, as well as empirical research methods used to solve real problems in developing the interface.	5	KC4 KC6 KC7
39	MIN601 Minor 1	Additional educational program (minor) - a set of disciplines and (or) modules and other types of educational work, determined by students for study in order to form additional competencies	5	KC2 KC3 KC6
40	NET6310	The purpose of the discipline "Linux Operating System" is to teach	5	KC7

	Linux Operating System	students the basics of working and managing the Linux operating system. Upon completion of the course, students should have an understanding of the core concepts of Linux and be able to use it effectively in a variety of scenarios.		
41	SFT6328 Development of mobile applications on IOS	The student will learn the features of databases and information assurance applications in operation systems iOS; will utilize enterprise information systems to support information security applications; to have basic skills in database administration of enterprise information systems.	7	KC2 KC3
42	SFT6311 Front-end development	In this course, students will study in detail the process of creating the client side of the site, namely the layout of the site template and the development of the user interface.	5	KC2 KC3
43	MIN602 Minor 2	Additional educational program (minor) - a set of disciplines and (or) modules and other types of educational work, determined by students for study in order to form additional competencies	5	KC2 KC3
44	MIN603 Minor 3	Additional educational program (minor) - a set of disciplines and (or) modules and other types of educational work, determined by students for study in order to form additional competencies	5	KC2 KC3
45	SFT6321 QA testing	This course includes theoretical and practical classes on the following topics: main types of testing; basics and classification of testing; testing principles; WEB-product testing; software development methodology; test design techniques; work with Requirements for the tester; compiling and working with checklists in practice; compiling and working with test cases in practice; compiling and working with bug reports in practice; compiling and working with test sets; work in the JIRA system, etc.	6	KC2 KC3
46	SFT6319 Blockchain technology	The Blockchain course is for those who want to learn more about blockchain technology and its applications. The course will look at how blockchain works, what its advantages and disadvantages are, what cryptocurrencies and tokens use blockchain, how to create and use smart contracts, and what are the examples of blockchain applications in various fields such as finance, logistics, medicine, etc. others	6	KC2 KC3
47	SFT6315 DevOps	The course examines the key concepts and principles of DevOps, organizational factors and automation tools in the development of software products using this method.	7	KC4 KC6 KC7
48	SFT6323 Programming on the QT platform	The course "Programming on the QT platform" is intended for those who want to master the development of cross-platform graphical applications in C ++ using QT - one of the most popular libraries for creating GUI applications. As part of the course, students will learn the basic concepts of QT, learn how to work with controls, create layouts and customize their appearance.	7	KC4 KC6 KC7
49	SFT6310 Web-component development (Java EE)	Introduction to Java Enterprise Edition (J2EE) technology. Learning the basic concepts of developing enterprise dynamic web applications in the Java programming language with high performance.	7	KC2 KC3 KC5 KC6 KC7
50	SFT6313 Mobile technologies and applications	Studying the design, implementation, testing, debugging and publishing of applications for Java-based smartphones.	7	KC2 KC3 KC5 KC6 KC7
51	SFT6314 Full stack development	Full Stack development is the development of databases, servers, systems engineering and customer interactions. Depending on the project, customers may need a mobile stack, a web stack, or their own application stack. The course examines the technologies needed to complete the "full stack" of the project.	5	KC2 KC3 KC5 KC6 KC7
52	SFT6376	The discipline "Microsoft .NET Framework - Application Development" is included in the university educational program and	5	KC2

	Microsoft .NET Framework	is intended for students interested in developing software on the Microsoft .NET Framework platform. The course includes learning the basics of technologies and tools used to create modern applications that run on the .NET platform. Within this discipline, students learn the basics of programming on the .NET platform, including the programming languages C# and Visual Basic.NET, as well as the basics of working with the Visual Studio integrated development environment. Students also learn how to build and debug applications that use various .NET components such as Windows Forms, ASP.NET, ADO.NET, WPF (Windows Presentation Foundation) and others.		КС3 КС5 КС6 КС7

4.4 List of modules and learning outcomes

Module name	Total number of credits	Learning outcomes	Criteria for assessing learning outcomes	Module-forming disciplines
GENERAL EDUCATION MODULES				
General education module	10	The student has an idea of the principles and laws 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, the place and role of philosophy in the life of society and man; the main stages of development of world and Kazakh philosophical thought.	Testing, oral interview, report, term paper, presentation, midterm.	History of Kazakhstan
				Philosophy
Social and political knowledge module	16	The student has an idea of socio-ethical values based on public opinion, traditions, customs, social norms and focuses on them in their professional activities; traditions and culture of the peoples of Kazakhstan; the rights and freedoms of man and citizen; the foundations of the legal system and legislation of Kazakhstan; social development trends in society; the basics of physical culture and the principles of a healthy lifestyle.	Testing, oral interview, report, term paper, presentation, midterm.	Political science
				Sociology
				Psychology
				Cultural studies
				Physical training
Language module	25	The student can freely express himself in writing and verbally, including professionally in the state language, the language of interethnic communication and English; knows how to logically correctly, reasonably and clearly build oral and written speech.	Testing, oral interview, term paper, presentation, midterm.	Foreign language
				Kazakh (Russian) language
				Professional Kazakh (Russian) language
				Professionally-oriented foreign language
BASIC MODULES				
Basic module	9	The student is able to use modern ICT in professional activities, independently versatile and critically analyze modern sources, draw conclusions, argue them and make decisions based on information.	Testing, oral interview, report, term paper, presentation, laboratory work, midterm control.	Information and communication technology
				Physics
				Research fundamentals
Math module	24	The student is able to use basic mathematical tools to solve professional problems.	Testing, oral interview, course, laboratory, control work, midterm.	Algebra and geometry
				Mathematical analysis
				Theory of probability and mathematical statistics
				Discrete math
				Information theory
PROFESSIONAL MODULES				
Programming module	40	The student is able to apply suitable data structures and develop appropriate algorithms to solve various computational problems. The student is able to use various tools for software	Testing, oral interview, course, laboratory, control work, midterm.	Introduction to data science
				Algorithmization and programming
				Parallel programming

		development, user interface, storage and data processing systems.		Object oriented programming
				Algorithms and data structures
				Linux Operating System
				Database design. Introduction to SQL
				Programming in Python
				Web technologies
				UX/UI development
Advanced programming module	40	The student is able to use various tools for software development, user interface, storage and data processing systems.	Testing, oral interview, course, laboratory, control work, midterm.	Web-component Development (Java EE)
				Minor 1
				Minor 2
				Mobile technologies and applications
				Full stack development
				Minor 3
				QA testing
				Front-end development
				DevOps
				Blockchain technology
				Programming on the QT platform
				Microsoft .NET Framework
				Development of mobile applications on IOS
Network and system administration module	20	The student is able to administer systems and networks of any configuration, troubleshoot and prevent threats.	Testing, oral interview, course, laboratory, control work, midterm.	Introduction to computer networks
				Fundamentals of information security
Project module	13	The student is able to use various software development methodologies, compile software documentation using the required diagrams, develop models of the logical and physical architecture of a software system, database, and manage the development process.	Testing, oral interview, course work, laboratory work, test work, midterm control.	Software architecture and design
				Economics and organization of production
				Project management

5 Curriculum of the educational program

№	Code	Subject	Number of hours								Study language	Result. control	Distribution of credits per semester		
			Total	STSH	SSH	Aud..	Contact hours						1	2	Extra term
							PS	L	Lab	SP			Number of academic credits	Number of academic credits	Number of academic credits
		Core subjects													
1	LAN6001A	Foreign language	150	15	90	45	45	0	0	0	by student's option	exam.	5		
2	ICT6001	Information and Communication Technologies	150	15	90	45	0	15	30	0	by student's option	exam.	5		
3	LAN6002A	Foreign language	150	15	90	45	45	0	0	0	by student's option	exam.		5	
4	PhC6005	Physical Culture	120	15	60	45	45	0	0	0	by student's option	exam.		4	
		Catalogue of University disciplines													
5	MAT6001**	Algebra and Geometry	120	15	60	45	30	15	0	0	by student's option	exam.	4		
6	SFT6301	Algorithmization and Programming	180	15	105	60	15	15	30	0	by student's option	exam.	6		
7	NET6301	Introduction to computer networks	120	15	60	45	0	15	30	0	by student's option	exam.	4		
8	SFT6305	Database Design. Introduction to SQL	180	15	105	60	15	15	30	0	by student's option	exam.	6		
9	PHY6001	Physics	120	15	60	45	0	15	30	0	by student's option	exam.		4	
10	MAT6002	Mathematical analysis	180	15	105	60	30	30	0	0	by student's option	exam.		6	
11	PP6301	Educational practice	60	0	0	60	0	0	0	60	by student's option	pract		2	
12	SFT6306	Software Architecture and Design	120	15	60	45	0	15	30	0	by student's option	exam.		4	
13	SFT6304	Programming in Python language	150	15	90	45	0	15	30	0	by student's option	exam.		5	
		Total	**1800**	**180**	**975**	**645**	**225**	**150**	**210**	**60**			**30.0**	**30.0**	**0.0**

№	Code	Subject	Number of hours								Study language	Result. control	Distribution of credits per semester		
			Total	STSH	SSH	Aud..	Contact hours						1	2	Extra term
							PS	L	Lab	WP			Number of academic credits	Number of academic credits	Number of academic credits
Core subjects															
1	LAN6001KR	Kazakh (Russian) language	150	15	90	45	45	0	0	0	by student's option	exam.	5		
2	PhC6006	Physical Culture	120	15	60	45	45	0	0	0	by student's option	exam.	4		
3	SPS6001	Philosophy	150	15	90	45	30	15	0	0	by student's option	exam.		5	
4	LAN6002KR	Kazakh (Russian) language	150	15	90	45	45	0	0	0	by student's option	exam.		5	
5	HK6002	History of Kazakhstan	150	15	90	45	30	15	0	0	by student's option	q. exam		5	
Catalogue of University disciplines															
6	MAT6005	Discrete mathematics	120	15	60	45	30	15	0	0	by student's option	exam.	4		
7	SFT6302	Algorithms and Data Structures	120	15	60	45	0	15	30	0	by student's option	exam.	4		
8	EGR6302	Information theory	150	15	90	45	0	15	30	0	by student's option	exam.	5		
9	SFT6322	Introduction of artificial intelligence	150	15	90	45	0	15	30	0	by student's option	exam.	5		
10	MAT6006	Probability theory and mathematical statistics	120	15	60	45	30	15	0	0	by student's option	exam.		4	
11	SFT6002	Object oriented programming	180	15	105	60	15	15	30	0	by student's option	exam.		6	
12	LAN6003PA	Professionally oriented foreign language	120	15	60	45	30	15	0	0	by student's option	exam.	4		
13	PP6302	Industrial practice	120	0	0	120	0	0	0	120	by student's option	pract		4	
Qualification examination															
14		История Казахстана												5	
		Total	**1800**	**180**	**945**	**675**	**300**	**135**	**120**	**120**			**31.0**	**29.0**	**0.0**

№	Code	Subject	Number of hours								Study language	Result. control	Distribution of credits per semester		
							Contact hours						1	2	Extra term
			Total	STSH	SSH	Aud..	L	PS	Lab	WP			Number of academic credits	Number of academic credits	Number of academic credits
Core subjects															
1	SPS6005	Psychology	60	15	15	30	15	15	0	0	by student's option	exam.	2		
2	SPS6004	Cultural studies	60	15	15	30	15	15	0	0	by student's option	exam.	2		
3	SPS6003	Political science	60	15	15	30	15	15	0	0	by student's option	exam.		2	
4	SPS 6002	Sociology	60	15	15	30	15	15	0	0	by student's option	exam.		2	
Catalogue of University disciplines															
5	ECO6002	Economics and organization of production	150	15	90	45	15	30	0	0	by student's option	t.w.		5	
6	LAN6007K	Business correspondence in the state language	60	15	15	30	0	30	0	0	by student's option	exam.	2		
7	SFT6307	Web-technologies	210	15	120	75	15	30	30	0	by student's option	exam.	7		
8	PP6303	Industrial practice	120	0	0	120	0	0	0	120	by student's option	pract		4	
Electives															
9	MIN601	Minor 1	150	15	75	60	15	15	30	0	by student's option	exam.	5		
10	SFT6309	UX/UI development	150	15	75	60	15	15	30	0	by student's option	exam.	5		
11	NET6310	Linux Operating System	150	15	75	60	15	15	30	0	by student's option	exam.			

12	SFT6313	Mobile technologies and applications (Android)	210	15	120	75	15	30	30	0	by student's option	exam.	7		
13	SFT6328	Development of mobile applications on IOS	210	15	120	75	15	30	30	0	by student's option	exam.			
14	SFT6311	Front-end development	150	15	75	60	15	15	30	0	by student's option	t.w.		5	
15	SFT6310	Web-Component Development (Java EE)	210	15	120	75	15	30	30	0	by student's option	t.w.		7	
16	MIN602	Minor 2	150	15	90	45	15	0	30	0	by student's option	exam.		5	
		Total	**2160**	**225**	**1035**	**900**	**210**	**300**	**270**	**120**			**30.0**	**30.0**	**0.0**

№	Code	Subject	Number of hours								Study language	Result. control	Distribution of credits per semester		
			Total	STSH	SSH	Aud..	Contact hours						1	2	Extra term
							L	Lab	PS	UGP			Number of academic credits	Number of academic credits	Number of academic credits
Catalogue of University disciplines															
1	RM6301	Research fundamentals	120	15	60	45	15	0	30	0	by student's option	t.w.	4		
2	SEC6301	Fundamentals of information security	120	15	60	45	15	30	0	0	by student's option	exam.	4		
3	ANL6301	Introduction to data science	180	15	105	60	15	30	15	0	by student's option	exam.	6		
4	SFT6325	Parallel programming	180	15	105	60	15	30	15	0	by student's option	exam.	6		
5	PM6301	Project management	120	15	60	45	15	30	0	0	by student's option	exam.		4	
6	PP6304	Pre-diploma practice	150	0	0	150	0	0	0	150	by student's option	pract		5	
Electives															
7	MIN603	Minor 3	150	15	90	45	15	30	0	0	by student's option	exam.	5		
8	SFT6314	Full Stack Development	150	15	90	45	15	30	0	0	by student's option	exam.	5		
9	SFT6376	Microsoft .NET Framework	150	15	90	45	15	30	0	0	by student's option	exam.			
10	SFT6321	QA testing	180	15	105	60	15	30	15	0	by student's option	exam.	6		
11	SFT6319	Blockchain technology	180	15	105	60	15	30	15	0	by student's option	exam.			
12	SFT6315	DevOps	210	15	120	75	15	30	30	0	by student's option	exam.	7		
13	SFT6323	Programming on the QT platform'	210	15	120	75	15	30	30	0	by student's option	exam.			
Qualification examination															
14		Diploma thesis/project												8	
		Total	**2100**	**180**	**1110**	**810**	**180**	**330**	**150**	**150**			**43.0**	**17.0**	**0.0**

6 Developer approval sheet

The title of the educational program: 6B06110 «Software Engineering»

№ п/п	Position, degree, last name and initials of a developer of the educational program	Date	Signature	Note
1	PhD, head of the «CE» department, associate professor T.T.Chinibayeva	30.03.2023		
2	MSc, senior-lector of the «CE» department Tokanov O.S.	30.03.2023		