«ТҰРАН»
УНИВЕРСИТЕТІ»
МЕКЕМЕСІ

УЧРЕЖДЕНИЕ
«УНИВЕРСИТЕТ
«ТУРАН»

FACULTY «ACADEMY OF CINEMA AND TELEVISION »

CHAIR «COMPUTER AND SOFTWARE ENGINNERING»

Approved
at scientific council sitting of
institution «Turan» University
Protocol № ___ dated «___»____ 2023
Rector
institution «Turan» University
_____ Alshanov R.A.

Approved at the EMS meeting
Protocol № ___ dated «___»____2023

MODULAR DEGREE PROGRAM

Code and name of specialty: 6B06102 – «Computer hardware and software engineering»

Academic degree: bachelor of engineering and technologies

Developed			Agreed		
Head of the chair «CSE», PhD	Kisseleva O.V.		Vice-rector for academic affairs	Tussupova L.A.	
Professor of «CSE» chair, candidate of technical sciences	Kubekov B.S.		Vice-Rector for External Relations and Doctoral Studies	Tayauova G.Zh.	
			Director of the DAA	Tussupova S.A.	
			Director of the OLC	Parshina G.N.	
			Dean of the faculty	Kuandykova D.R.	
			Head of the Department of EMW	Suleimenova N.O.	

Considered at a meeting of the Academic Committee of the University «Turan»
Protocol № ____ dated «__» ___ 2023.
Chair's of the Academic Committee _____ Margatskaya G.S.

Discussed at the sitting of the chair «Computer and software engineering»
Protocol № ____ dated «___» _____ 2023.

Chair’s head _____ Kisseleva O.V.

Almaty, 2023

Structure of the educational program

1 Passport of the educational program
2 Learning outcomes
3 Policy for evaluating learning outcomes (current and final control, intermediate and final certification)
4 Learning outcomes matrix
5 Graduate qualification model
6 Catalog of academic disciplines (compulsory, university-wide, elective)
7 Curriculum of the educational program for the entire period of study*

** Generated by a separate document in the Automated Control System "Turan".*
Includes the distribution of modules by year of study, taking into account prerequisites, labor intensity, and distribution of the academic load by type of activity

1. Passport of the educational program

1.	Registration number	6B06100070
2.	Code and name of the field of education	6B06 Information and communication technologies
3.	Code and name of the training	6B061 Information and communication technologies
4.	Code and name of the group of educational programs	B057 Information technologies
5.	Code and name of the educational program	6B06102 Computer engineering and software
6.	The purpose of the educational program	Training of highly qualified specialists for innovative sectors of the country's economy in the field of the latest telecommunications technologies, possessing theoretical, practical and scientific knowledge, skills and abilities that meet the needs of domestic and global intellectual and engineering labor markets, able to quickly adapt to constantly changing socio-economic conditions in the light of the prospects for the development of the information and communication sphere.
7.	Type of educational program	Current
8.	Level in accordance with the NRC	6
9.	Level in accordance with the ORC	6
10.	Professional Standard (year)	Professional standards: «Database administration» «Testing multimedia applications (including computer games)» «System and Network Administration» 05.12.2022y. №222
11.	Compliance with the Atlas of New Professions and Competencies of Kazakhstan (2020)	https://www.enbek.kz/atlas/en/profession/104 https://www.enbek.kz/atlas/en/profession/422 https://www.enbek.kz/atlas/en/profession/57
12.	Distinctive features of the educational program	Students of specialty “Computer hardware and software engineering” have knowledge in the field of the information theory, architecture of the computer, the organization of computing systems, bases of the database, the system software, a computer and engineering graphics, Internet – technologies, computer networks, numerical methods, models and methods of management of mathematical methods in economy, the economic theory, operating systems, work benches of development of programs, interfaces of computer systems.
13.	Basic level required for mastering the EP	The state compulsory standard of general secondary education, the state compulsory standard of technical and vocational education.

14.	Language of instruction	Kazakh, Russian
15.	Amount of credits	240
16.	Degree awarded	Bachelor
17.	Qualifications awarded	Bachelor's degree in information and communication technologies in the educational program "6B06102 - Computer engineering and Software"
18.	Duration of training	4 years
19.	License number for the direction of training and its appendices	**State license: No.** 14001575, 05.02.2014 **Registration No.:** AB 2309/1
20.	The name of the accreditation agency and the validity period of the accreditation	**IAAR** **Certificate validity period:** 05.04.2019 - 04.04.2026

2. Learning outcomes

Formulation of the training result	**№ ON in the EP Register**	**ON***
Able to adapt in a multicultural and multilingual environment and communicate to solve the problems of interpersonal and professional interaction, demonstrating mastery of the culture of written and oral speech, to state his position in a reasoned manner.	ON1	GC
Able to analyze the market and business processes, use modern management methods to achieve business goals.	ON2	GC
Able to work in a team, has inter-industry communications and leadership skills, conflict-free communication skills.	ON3	GC
Able to adapt to new situations and work in the mode of partial uncertainty, make independent, autonomous decisions.	ON4	GC
Able to carry out project activities under the guidance and in a team to solve cultural and socio-economic problems.	ON5	GC
It is able to solve socio-economic problems of the region's development, tasks of the anti-corruption policy of the Republic of Kazakhstan, environmental improvement.	ON6	GC
To argue the choice of basic standards, principles and design patterns, methods, tools and programming languages, including choosing methods and means of building information security systems of modern ICT.	ON7	PC
Own programming tools and environment, modern programming technologies.	ON8	PC
Create and/or apply mathematical models and methods of various processes.	ON9	GC
Design database, software and information system architectures.	ON10	PC
Design and develop ergonomic user interfaces.	ON11	PC
Develop and/or use software, hardware, information, mathematical, functional support of information systems, including algorithms and methods of information security.	ON12	PC
To carry out installation, configuration, testing and maintenance of system and application software of computer systems and networks.	ON13	PC

To show sociability, initiative and psychological readiness for work, including when working in a team, and to make managerial and technical decisions.	ON14	GC

** Learning outcomes expressed in terms of competencies: general (GC) and professional competencies (PC).*

3. Policy of evaluation of learning outcomes (current and final control, intermediate and final certification)

To obtain a bachelor's degree based on the results of training in the EP, the student must master at least 240 credits.

The educational program is updated and supplemented annually, taking into account the interests of the labor market. The change in compulsory disciplines occurs due to the introduction of the State Mandatory Standard of Higher and Postgraduate Education, approved by Decree of the Government of the Republic of Kazakhstan dated October 31, 2018 No. 604, standard curricula approved by Order of the Minister of Education and Science of the Republic of Kazakhstan dated October 31, 2018 No. 603, working curricula and work programs and other regulatory documents of the Ministry of Education and Science of the Republic of Kazakhstan RK.

The structure of educational programs "6B06102 – Computer Engineering and Software" of Turan University is developed in accordance with scientific, theoretical and practice-oriented requirements for professional and social competencies.

Learning outcomes are formed both at the level of the entire EP, and at the level of individual modules or academic discipline.

The Academic Policy of the University reflects the general principles and basic methods of evaluating the planned learning outcomes. The policy of evaluation of learning outcomes in the disciplines of EP is developed by teaching staff in syllabuses in accordance with the principles of academic integrity.

The quality control system for the direct training of an EP specialist is carried out through ongoing monitoring of academic performance, intermediate and final certification. The form and types of their conduct are determined in accordance with the Rules of the ongoing monitoring of academic performance, intermediate and final certification of students of the University "Turan". When organizing the educational process according to the educational program, a point-rating system for evaluating student performance is used.

Monitoring of students' academic achievements and evaluation of learning outcomes in academic disciplines or modules is organized by the Registrar's office at the milestone stages of the educational process (at the end of each academic period and academic year) and should be focused on the final learning outcomes

The final certification is carried out upon completion of the EP.

The purpose of the final certification is to evaluate the achieved learning outcomes. The final certification of graduates of EP 6B06102 "Computer engineering and software" includes the defense of a diploma project or the passing of a final comprehensive exam in the specialty, which allows to identify and evaluate theoretical and practical training for solving professional problems, readiness for the main types of professional activity.

The bachelor's degree project should reflect knowledge, show skills and competencies in its activities and constantly replenish them, demonstrating a deep understanding of the specifics of the profession and its impact on the social sphere and education.

Persons who have completed their studies under the educational program "Computer Engineering and Software" are issued a diploma of education of their own sample of the University "Turan" with an appendix and an indication of the bachelor's degree / qualification, as well as a pan-European diploma Supplement (Diploma Supplement).

4. Learning outcomes matrix

№	Name of the module (discipline)	Learning outcomes														
		ON1	ON2	ON3	ON4	ON5	ON6	ON7	ON8	ON9	ON10	ON11	ON12	ON13	ON14	ON15
1	The History of Kazakhstan	+	+				+									
2	Foreign Language – I, II	+	+												+	
3	Kazakh (Russian) language– I, II	+														
4	Information and Communication Technology							+			+		+			
5	Physical training -I, II, III, IV			+												
6	Sociology	+				+	+									
7	Political science														+	
8	Cultural studies	+				+										
9	Psychology			+	+										+	
10	Philosophy					+	+								+	
11	Algorithmic and Programming							+	+				+			
12	Academic writing	+				+										
13	Mathematics				+					+						
14	Physics			+	+											
15	Academic internship															
16	Electronics									+			+			
17	Digital circuitry							+			+					
18	Architecture and organization of computer systems											+		+		
19	System programming													+		
20	Practical Internship -I	+		+											+	
21	Programs development Device							+	+						+	
22	Database Management System											+				
23	Practical Internship -II	+		+											+	
24	Design and development of architecture of the client-server software (Cisco)												+	+		
25	Methods and tools to protect computer information								+	+		+	+			
26	Introduction to entrepreneurship		+		+											
27	Organization of business		+			+										
28	Marketing tools in entrepreneurship				+	+										
29	Marketing analysis				+		+									
30	Business Legislation		+	+	+											
31	Legal regulation of business activities	+	+	+											+	
32	Object-focused programming								+							
33	Programming on the Java								+			+				
34	Operating systems Linux							+		+			+			
35	Operating systems Unix							+		+			+			
36	Business planning		+	+												
37	Development of a technological start – up		+						+							

38	Development of mobile applications								+				+			
39	Programming applications on a platform 1C									+				+		
40	Management of innovation processes		+							+						
41	Project management		+												+	
42	Data storage and management of information										+			+		
43	Management Models and methods	+								+						
44	Web-technologies							+	+			+	+			
45	Software Development Technologies							+	+				+			
46	Computer networks											+	+			
47	Design and maintenance of computer networks												+	+		
48	Computer Graphics							+	+			+	+			
49	Multimedia Technologies			+								+				
50	Software Engineering													+		
51	Distributed Systems Design				+								+		+	
52	Expert systems			+											+	
53	Artificial Intelligence Systems							+	+							
54	Management of communications and computer systems in team work			+		+					+	+	+			
55	Management and control of team software development			+		+					+	+				
56	Cloud Management Systems for IT Enterprises				+								+			
57	Cloud Technologies for Planning and Organizing IT Enterprises		+	+												
58	Professional Kazakh (Russian) language	+		+												
59	Professionally oriented foreign Language	+		+											+	
60	Methods of cryptography								+				+			
61	Pregraduation internship															
62	Fundamentals of anti-corruption culture						+									
63	Fundamentals of ecology and life safety						+									
64	Practical Internship-III	+		+											+	

5. Qualification model of a graduate of an educational program

Type of professional activity	Labor functions	Qualification requirements	Job titles	Qualification level	Learning outcomes

Database administration	Software installation and configuration	**Skills and abilities:** 1. Planning the installation of system software. 2. Installation and management of hardware and software resources. 3. Installation and configuration of system and application software. 4. Taking measures in case of errors during installation and configuration of the software. 5. Using the technical documentation for installing and configuring the software. **Knowledge:** 1. The composition of the operated hardware and software complex and the characteristics of its components. 2. Functionality of the installed software, including the OS. 3. Requirements for the installed software. 4. Mechanisms of resource management of the hardware and software complex. 5. Methods of configuration and configuration of system and application software. 6. Principles of information security.	"Database Administrator"	5th level ORC	ON10 ON13
Testing multimedia applications (including computer games)	Planning and design of the game architecture and development of the code algorithm	**Skills and abilities:** 1. Define the game strategy, genre, classes, objects, methods and events of objects and classes. 2. Manage game development planning (distribute functions, execution schedule, etc.). 3. Use computer game design patterns. **Knowledge:** 1. Digital game genres 2. Computer game design patterns 3. Management software, management methods. 4. Software tools for process management.	Computer game developer (Multimedia application Developer)	7th level ORC	ON8 ON12
System and network administration	Design, installation and maintenance of the organization's LAN	**Skills and abilities:** 1. Installation of active equipment, servers, switches, uninterruptible power supplies. 2. Installation and configuration of software on workstations to ensure the work of LAN users. 3. Correction and elimination of software malfunctions of peripheral devices. 4. Checking the operability of each element and the LAN as a whole. 5. Selection of LAN construction	"System and Network Administration Specialist (system administrator)"	5th level ORC	ON10 ON13

		options. 6. Maintenance of operational documentation. 7. Creation of remote offices. Advising employees on working with LAN, computer equipment, peripherals and software. **Knowledge:** 1. Protocols for the transmission of all types of information. 2. Installation of computer local area networks. 3. Design, installation and configuration of LAN, SCS. 4. Fundamentals of LAN technology.			

6. Catalog of academic disciplines (compulsory, university-wide, elective)

Information about disciplines				
№	**Name and code* of the discipline**	**Brief description of the discipline**	**Number of credits**	**Learning result**
GEC CC				
1	The History of Kazakhstan HK B02	The discipline "History of Kazakhstan" is aimed at studying socio-economic, political, ideological, cultural events, phenomena, processes that took place on the territory of Kazakhstan from ancient times to the present day. The purpose of the discipline "History of Kazakhstan" is to form an objective representation of the main stages of the history of Kazakhstan; to direct students' attention to the problems of the formation and development of statehood, socio-economic, political, historical and cultural processes. Teaching methods and technologies used in the process of teaching the discipline: student-centered learning based on a reflective approach to learning on the part of the student; competence-based learning; role-playing games and educational discussions of various formats; case study; project method. The discipline ends with passing the state exam on the history of Kazakhstan.	5	ON1, ON2, ON6
2	Kazakh (Russian) language - I K(R)L B02	This programme is a core compulsory subject. To form lexical and grammatical competences enabling speech communication in a variety of social situations, to form speech skills and abilities in speech activities, as well as the formation of a social and humanitarian outlook of students in the context of the nationwide idea of spiritual modernization, involving the development of qualities of internationalism, tolerant attitude towards world cultures and languages as translators of world-class knowledge, advanced modern technology on the basis of national consciousness and cultural code.	5	ON1

3	Foreign Language - I FL(I) B02	The course is aimed at developing a student's foreign language communicative competence - a system of knowledge, skills and effective communicative skills in a foreign language environment at the level necessary for mastering the language.	5	ON1, ON2, ON14
4	Information and Communication Technology ICT B02	The main directions of ICT development; Standardization in ICT. Introduction to computer systems; Architecture of computer systems. Operating systems and software. Human-computer interaction. Database systems. Data analysis and management. Networks and telecommunications. Cybersecurity. Internet technologies. Cloud and mobile technologies. Multimedia technologies. Smart technologies. E-technologies. Electronic business. E-learning. Electronic government. Information technologies in the professional field of Industrial ICT. Prospects for the development of ICT	5	ON7, ON10, ON12
5	Physical training - I PT(I) B02	1) the formation of physical culture of the student's personality by mastering the basics of the content of physical activity with a general developmental orientation; 2) the formation of stable motives and needs for a careful attitude to one's health; 3) holistic development of physical and mental qualities; 4) creative use of means of physical culture in the organization of a healthy lifestyle.	2	ON3
6	Kazakh (Russian) language - II K(R)L(II) B02	This programme is a core compulsory subject. To form lexical and grammatical competences enabling speech communication in a variety of social situations, to form speech skills and abilities in speech activities, as well as the formation of a social and humanitarian outlook of students in the context of the nationwide idea of spiritual modernization, involving the development of qualities of internationalism, tolerant attitude towards world cultures and languages as translators of world-class knowledge, advanced modern technology on the basis of national consciousness and cultural code.	5	ON1
7	Foreign Language - II FL(II) B02	As a result of studying the course, students should deepen their knowledge of phonetics, vocabulary, word formation, grammar of a second foreign language and learn how to work with the text. To study the features of translation in terms of text types, their stylistic affiliation.	5	ON1, ON2, ON14
8	Physical training - II PT(II) B02	1) the formation of physical culture of the student's personality by mastering the basics of the content of physical activity with a general developmental orientation; 2) the formation of stable motives and needs for a careful attitude to one's health; 3) holistic development of physical and mental qualities; 4) creative use of means of physical culture in the organization of a healthy lifestyle.	2	ON3

9	Physical training - III PT(III) B02	1) the formation of physical culture of the student's personality by mastering the basics of the content of physical activity with a general developmental orientation; 2) the formation of stable motives and needs for a careful attitude to one's health; 3) holistic development of physical and mental qualities; 4) creative use of means of physical culture in the organization of a healthy lifestyle.	2	ON3
10	Physical training - VI PT(VI) B02	1) the formation of physical culture of the student's personality by mastering the basics of the content of physical activity with a general developmental orientation; 2) the formation of stable motives and needs for a careful attitude to one's health; 3) holistic development of physical and mental qualities; 4) creative use of means of physical culture in the organization of a healthy lifestyle.	2	ON3
11	*Socio-political knowledge module* Sociology Soc B02	The course "Sociology" is focused on the formation of students' skills to attract resources of sociological knowledge for analysis and a deeper understanding of the social situation and social processes taking place in modern, primarily Kazakh, society, the development of a theoretically meaningful social position, the solution of life challenges.	2	ON1, ON5, ON6
12	Political science PS B02	The purpose of studying the discipline "Political Science" is to form students' basic scientific knowledge about the subject and methods of political science, the evolution of political thought, the laws of political life, the trends of the political process and the features of its implementation in specific countries and on a global scale; to help students navigate the political reality, to develop a scientific approach to assessing certain political events and phenomena, norms of political thinking and behavior; to equip them with the knowledge necessary for the creative solution of their professional problems, the formation of a democratic political culture.	2	ON14
13	Cultural studies CS B02	The discipline "Cultural Studies" is aimed at developing a socio-humanitarian worldview as the basis for the modernization of public consciousness through the formation of cultural identity, the ability to analyze and evaluate cultural situations based on understanding the nature of cultural processes, the specifics of cultural objects, the role of cultural values in intercultural communication.	2	ON1, ON5
14	Psychology Psy B02	The discipline involves the study of psychology as a scientific discipline that has its own subject, terminology and research methods. The purpose of the discipline: the formation of the socio-psychological worldview of students in the context of solving the tasks of modernization of public consciousness, defined by the state program	2	ON3, ON4, ON14

		"Looking into the future: modernization of public consciousness".		
15	Philosophy Phil B02	The course "Philosophy" is the main and obligatory for all bachelor's degrees. In the process of studying it, students will gain knowledge about the stages of philosophy development, about the specifics of Kazakh philosophical thought, get acquainted with the main problems, concepts and categories of philosophy. The purpose of the discipline is to form students' basic ideas about philosophy as a special form of cognition of the world, about its main sections, problems and methods of their study in the context of future professional activity; to acquaint students with the philosophical texts of outstanding thinkers and the formation of their critical comprehension skills; to develop the ability to logically express their thoughts, competently conduct philosophical discussion and argumentatively defend their own positions on topical issues of our time; to form Kazakhstani patriotism and an active civic position; to contribute to the acquisition of ideological and spiritual guidelines by a future specialist in a modern complex and rapidly changing world.	5	ON5, ON6, ON14
		GEC EC		
16	Fundamentals of anti-corruption culture FACC B04	The discipline is aimed at obtaining theoretical knowledge about aesthetic concepts and categories, content and features, the essence of anti-corruption culture. The course forms the acquisition of skills to work with legislation in the field of anti- corruption, and develops a civic attitude to this phenomenon.	5	ON6
17	Fundamentals of ecology and life safety FELS B02	This discipline is for obtaining theoretical knowledge in the field of ecology and human life safety; it is forming a holistic view of the environment and the basic laws of society sustainable development. The course designed to form a general systemic view and understanding of modern ideas about ecology and the environment.		ON6
		BC UC		
18	Algorithmic and Programming AP B02	Within this discipline, the features of algorithms and their implementation in the selected programming language, features and recent advances in the development of cross-platform software, basic technologies and mechanisms used in information and computer systems for programming, as well as the basics of the language and data types, operators, lists, functions, arrays, sets, dictionaries, modules.	8	ON7, ON8, ON12
19	Academic writing AW B02	The aim of the course is to master the principles of academic writing (essays, abstracts, papers, dissertations, etc.) and the skills of writing them. The course aims to gain experience in bibliographic description of printed publications and electronic resources, designing one's own written work, public presentation and discussion of academic papers, debating and defending one's position.	5	ON1, ON5

20	Mathematics Mat B02	The main purpose of teaching mathematics is to provide the country's economy with qualified professional specialists, to educate a developed personality capable of continuing education at the next stage of higher education and to train specialists in the field of computer technology and software with practical skills and leadership qualities that meet modern requirements for the quality of specialists with higher education. The principles of education are built in accordance with the basic principles of education and science and are aimed at achieving academic mobility of students and their successful adaptation to the labor market.	4	ON4, ON9
21	Physics Phy B02	Within this discipline, the basic physical theories and principles, physical research methods, basic laws and principles of their application, as well as the following sections are studied: mechanics, molecular physics and thermodynamics, electricity, magnetism, optics, quantum physics, atomic nucleus and elementary particles.	3	ON3, ON4
22	Academic internship AI B01	Educational practice is an integral part of the student training program. The main content of the practice is the implementation of practical training, educational research, creative tasks corresponding to the nature of the future professional activity of students.	1	
23	Electronics Elec B02	The discipline is aimed at studying the basic principles of building electronic circuits, the functioning of amplifying and converting cascades, signal generators, electrical filters, the principles of operation of analog integrated circuits, as well as various aspects of the application of the electronic element base in practice.	4	ON9, ON12
24	Digital circuitry DC B02	Within the framework of this discipline, the parameters of semiconductor devices and system engineering elements are studied; logical elements and logical design in chip bases; functional nodes (decoders, encoders, multiplexers, multiplexers, digital comparators, adders, triggers, registers, counters); memory devices based on LSI / VLSI; digital-analog and analog-digital converters.	4	ON7, ON10
25	Architecture and organization of computer systems AOCS B02	Within the framework of this discipline, the issues of computer architecture development, multi-program mode of computer operation, overview of the main families of microprocessors, architecture of computer networks, wireless communications, security in networks are studied.	5	ON11, ON13
26	System programming SP B02	Within the framework of this discipline, the basic concepts of system programming, thread and process management, synchronization of threads and processes, memory management, file system management, dynamically connected libraries, programming console applications, hardware programming are studied.	6	ON13
27	Practical Internship - I	Ability and willingness to work in a team, finding solutions in non-standard situations and social conflicts, and ways of peaceful ways of interaction.	4	ON1, ON3, ON14

	PI(I) B01			
28	Programs development Device PDD B02	Within the framework of this discipline, methods of designing and the life cycle of programs, a unified modeling language, tools for supporting the life cycle of software development, and building a program interface are studied.	8	ON7, ON8, ON14
29	Database Management System DMS B02	Within this discipline, we study the typical organization of a modern DBMS, the logging of database changes, elements of the SQL language, the DBMS Architecture (InterBase, MySQL, Oracle), the transaction mechanism, the description of the environment interface (Delphi, C ++ Builder, FoxPro) and its components for working with client server database.	5	ON11
30	Practical Internship - II PI(II) B01	The internship will allow the learner to consolidate possession of professional skills in a specialty, gain experience in a professional team, gain initial skills in solving practical problems, study the procedure for analyzing the main economic indicators of enterprises, take part in developing relevant reports and documents, consolidate methods, techniques and methods economic calculations, to develop skills in the preparation of basic financial documents.	4	ON1, ON3, ON14
31	Design and development of architecture of the client-server software (Cisco) DDACSS(Cisco) B02	The discipline is aimed at project work, they will learn how to work with Linux server operating systems, acquire development skills through remote access, study the principles of deploying a software environment and backend functioning processes. During the project work, students study technologies: Apache foundation Solutions & Projects, ElasticSearch, Django/Laravel, Twig, Blade, Jinja, Jupyter and the concepts of SQL & NoSQL Databases, MVC, VIPER, relevant official documentation on modern technologies. There is a certification.	5	ON12, ON13
32	Methods and tools to protect computer information MTPCI B02	The objective of the discipline Methods and means of computer information protection is to study the basic principles and methods of modern means of information protection in computer systems and networks.	4	ON8, ON9, ON11, ON12
		BC EC		
33	Introduction to entrepreneurship IE B02	The purpose of the discipline: the formation of knowledge, skills and skills on the formation, organization and conduct of entrepreneurial activities in the market. The discipline considers the essence and types of entrepreneurship, the main skills and role of the entrepreneur, design thinking, innovations in entrepreneurship, organizational foundations of business, financial management in entrepreneurship, analysis of the market environment of business, culture of entrepreneurial activity, image of the entrepreneur.	5	ON2, ON4
34	Organization of business	The discipline examines the concept and history of business development, issues of organizing small, medium and large businesses, venture business,		ON2, ON5

	OB B02	classification of types of business, forms of doing business, the procedure for registering business entities, bankruptcy and liquidation of an enterprise, the need to create a business infrastructure, the basic principles of management, personnel management in business, business ethics, the basics of business planning. The course aims to develop the skills of organizing business processes and develop students" competence in entrepreneurship.		
35	Marketing tools in entrepreneurship MTE B02	Discipline "Marketing tools in entrepreneurship" Business marketing environment. Conducting mini-marketing research on a business problem. Identification of a market segment, identification of key characteristics of consumer behavior. Fundamentals of commodity and pricing policy. Solutions for product movement and distribution in the marketing system. Programs for the promotion of goods and services. Brand book development, formation of entrepreneur reputation management programs. Social Media Marketing (SMM)	5	ON4, ON5
36	Marketing analysis MA B02	The purpose of the discipline: the formation of competencies in the field of analysis and assessment of the psychological aspects of marketing and advertising. The discipline studies various types of marketing analysis, identification of niches and market opportunities, retail analytics, competitive intelligence, analytical marketing system and presentation of results, consumer loyalty management, development of marketing solutions.		ON4, ON6
37	Business Legislation BL B02	The purpose of the discipline: the formation of competencies necessary for project management, the organization and management of the team, the development of a team strategy, the implementation of legal actions and the legal qualification of facts and circumstances. The course implies acquaintance with the legislation in the field of business, its support and development in the Republic of Kazakhstan, subjects of legal relations, with the forms, legal capacity of legal entities, legal regulation of transactions and contracts, binding law.	5	ON2, ON3, ON4
38	Legal regulation of business activities LRBA B02	Business law determines the legal conditions and guarantees ensuring freedom of entrepreneurship in the Republic of Kazakhstan, regulates social relations arising from the interaction of business entities and the state, including government regulation and support for entrepreneurship.		ON1, ON2, ON3, ON14
39	Object-focused programming OFP B02	The discipline examines an object-oriented approach to software development; the features of an object-oriented approach to software development will be studied; practical skills in developing user interfaces and programming in an object-oriented language will be acquired; practical skills in developing software products with a complex structure, as well as libraries and plug-ins to expand the capabilities of ready-made software products will be acquired.	4	ON8

40	Programming on the Java PJ B02	Java technology and its application. Basic information about Java. Characteristic. Features. Java virtual machine. The Java platform. Java versions: Java SE, Java EE, Java ME, Android SKD. Overview of development environments. Syntax. Data types. Object-oriented programming in Java. Principles of object-oriented application design. Exception handling. Collections. Basic I/O. The JAVA event handling model. Network programming. Package Facilities java.net . Overview of EJB. Working with Web Services.		ON8, ON11
41	Operating systems Linux OSL B02	Within the framework of this discipline, the basic structures and mechanisms of various operating systems, the architecture of operating systems, as well as practical skills of working in the Linux operating system are studied	8	ON7, ON9, ON12
42	Operating systems Unix OSU B02	Within the framework of this discipline, the features of the Unix operating system, the architecture of operating systems are studied, practical skills of working in the Unix operating system are given.		ON7, ON9, ON12
43	Business planning BP B02	The course includes the study of business models, the essence, the content of the methodology and organization of business planning, the role of marketing research in business planning. The study of this discipline will provide competence on the methodology of the business plan, risk assessment in the business plan, the calculation of the break-even point of the business plan.	5	ON2, ON3
44	Development of a technological start-up DTS B02	Basic methodologies for the development of technology startups. Introduction to entrepreneurship for OT projects. Technologies for generating ideas. Popular business models. Customer Development: working with brain maps. Business modeling templates. Creating a prototype. MVP, SWOT analysis. Expert assessment of the market and elaboration of the business model. Team building and project management. Attracting investments. Presentation of the project to investors		ON2, ON8
45	Development of mobile applications DMA B02	Within the framework of this discipline, the main directions of the technical implementation of mobile communication systems, the architecture of modern mobile devices, the principles of publishing developed mobile applications, basic information about the Android platform, Android application components are studied	4	ON8, ON12
46	Programming applications on a platform 1C PAP1C B02	The course examines the methods used in the development of configurations, built-in mechanisms that ensure the creation of their components, and also develops a number of practical skills and programming skills in an embedded language that implements algorithms for the behavior of both individual configuration objects and applied solutions of the 1C system.:Enterprise"		ON9, ON13
47	Management of innovation processes	The discipline is aimed at mastering by students the theoretical foundations of innovation process management, the life cycles of various types of	5	ON2, ON9

	MIP B02	innovations; the formation of an innovative type of thinking. After studying the discipline, students should know the features and main directions of the development of innovative project management; be able to identify risks in an innovative project; have the skills to develop recommendations for improving organizational and managerial activities for the implementation of innovative results.		
48	Project management PM B02	Upon completion of the course, students will be able to initiate a project; determine the scope and content of the project; create a hierarchical structure of work; determine resource requirements and assign them; develop a schedule, budget, project plan; interpret risk management processes use MS Project software. Students can at the end of the course be certified for the award of professional qualifications "Assistant Project Manager." Training methods - brainstorming, cases, business games.		ON2, ON14
49	Data storage and management of information DSMI B02	Within the framework of this discipline, the problems of the information boom and changes in the nature of stored information are studied, definitions of the data storage system and the data center environment are given, an overview of the development of data storage technology is provided and an introduction to intelligent data storage systems is given.	6	ON10, ON13
50	Models and methods of control MMC B02	Within the framework of this discipline, algorithms for solving various applied engineering problems, mathematical methods in various fields of economics and management, practical skills in applying mathematical programming methods are studied.		ON1, ON9
		PC EC		
51	Web-technologies WT B02	Introduction to Web technologies. HTML markup language. Cascading CSS style sheets. Programming using JavaScript. PHP language. MySQL DBMS. To study the basic concepts and principles of the Internet, the creation of web sites.	4	ON7, ON8, ON11, ON12
52	Software Development Technologies SDT B02	Within the framework of the discipline "Software Development Technologies", the methodologies and tools used in IT design at the stages of requirements engineering and analysis are studied. The main characteristics of SWEBOK knowledge, consulting in the field of information technology, methodology of structural approach analysis, concepts and mechanisms of the object model are considered. While studying the discipline, students will master the technologies of analysis and design in the development of IT projects.		ON7, ON8, ON12
53	Computer networks CN B02	Mastering the principles of organization and functioning of computer networks, features of PC operation in networks, familiarity with modern computer network technologies and methods of transmission, storage, search, processing and presentation of information, as well as obtaining practical skills in local networks.	4	ON11, ON12
54	Design and maintenance of	Within the framework of the discipline "Design and maintenance of computer networks", network		ON12, ON13

	computer networks DMCN B02	concepts are studied: protocols, technologies of local and global networks, methods of network implementation, telecommunication systems, wireless networks, configuration of network capabilities of operating systems; interaction of local and global networks, methods of data transmission in global networks.		
55	Computer Graphics CG B02	Within the framework of the discipline "Computer Graphics", interactive graphics systems, computer graphics hardware, vector graphics, raster graphics, methods of eliminating gradation, geometric transformations, object transformation, color in computer graphics, removal of invisible lines and surfaces, construction of realistic images, ray tracing, materials and lighting in OpenGL are studied.		ON7, ON8, ON11, ON12
56	Multimedia Technologies MT B02	The purpose of this discipline is to familiarize students with the principles of using, directions of modern multimedia technologies. Within the framework of the discipline "Multimedia Technologies", multimedia applications, methods of programming three-dimensional graphics, creating spectacular visual effects, development of offline applications, techniques for developing cartographic services, visualization of complex data and research results, Microsoft Razor technologies are studied.	4	ON3, ON11
57	Software Engineering SE B02	Within the framework of this discipline, the issues of effectively making informed decisions on the choice of hardware, design and purchase of software products and applied office information systems are studied; setting and solving tasks related to the optimization of business processes; using modern means of working with information in text, graphical and tabular representation, as well as databases; using a unified modeling language in the design of software systems.	5	ON13
58	Distributed Systems Design DSD B02	Within the framework of this discipline, the main approaches and technologies for the development of distributed applications are studied; the main models of information systems and principles of modeling (design); the main methods and means of designing information systems using structural and object-oriented approaches.		ON4, ON12, ON14
59	Expert systems ES B02	The discipline is aimed at forming students' professional competencies in the field of modern and promising technologies for creating and implementing expert systems, mastering the purpose and scope of expert systems; theoretical aspects of artificial intelligence technology; mathematical and algorithmic foundations of expert systems design, as well as knowledge representation models based on product systems, semantic networks, frames and logical inference, formation of knowledge presentation skills, design, implementation and maintenance of expert systems.	4	ON3, ON14

60	Artificial Intelligence Systems AIS B02	Within the framework of this discipline, the stages of the development of artificial intelligence, the tasks of artificial intelligence systems and methods of their solution, the main types of logical conclusions, the uncertainty of knowledge and methods of their processing are studied.		ON7, ON8
61	Management of communications and computer systems in team work MCCSTW B02	The discipline is aimed at preparing students: - to be ready to put into practice knowledge and skills in the field of communication management methodology and computer systems, skillfully combining the principles of teamwork, the specifics of working in an interdisciplinary and international team; - the ability to put into practice knowledge and skills in the field of planning and organization of individual and team work, the basic principles of applied ethics, problems of responsibility in technology, forecasting the social, economic and environmental consequences of decisions taken, self-management of their educational activities, analysis of problems and processes in the professional field, training, planning, controlling and principles decision-making in the management of domain projects; - to develop software applications and projects, the ability to make management decisions, assess their possible consequences and be responsible for them.	6	ON3, ON5, ON10, ON11, ON12
62	Management and control of team software development MCTSD B02	Discipline examines and studies the basic theoretical concepts and course definitions, ways and methods of planning and organizing team management, the formation of the necessary skills to effectively fulfill the functional duties of a programmer and team leader, understanding work objectives, the ability to do assigned work. Discipline is aimed at preparing students for: -the willingness to put into practice knowledge and skills in the field of values and goals, self-organization and self-management by joint software development control activities, conduct mutual control, apply mutual assistance and interchangeability, show collective responsibility for the results of work, fully develop and use individual and group potential. At the end of the course, students can be certified for the award of the professional qualification “Management and Control of Team Development Software”. Training methods - brainstorming, cases, business games.		ON3, ON5, ON10, ON11
63	Cloud Management Systems for IT Enterprises CMSITE B02	The discipline considers: the main types of cloud architectures: IaaS, SaaS, PaaS and cloud services: Amazon EC2, Google Apps, Windows Azure, PaaS; the essence and concepts of the public cloud model, private cloud models, hybrid cloud models, cloud services, basic security issues in the clouds. The discipline is aimed at developing skills and abilities to develop projects and software applications using the design features of cloud architectures, correctly store data and configure network interactions, make decisions on the use of cloud technologies, network models of cloud services, and calculate risks associated with the use of cloud computing. At the end of the course, students can be certified for the		ON4, ON12

		assignment of professional qualifications "Cloud Services (SaaS)", "Microsoft Azure Cloud Platform - basic course". Teaching methods – brainstorming, case studies, business games.		
64	Cloud Technologies for Planning and Organizing IT Enterprises CTPOITE B02	The discipline is aimed at mastering knowledge about technologies, principles and methods of building and operating cloud services in the development of software applications and projects; using cloud deployment models: private cloud, public cloud, hybrid cloud, public cloud; using cloud services: Platform as a Service (PaaS), Infrastructure as a Service (IaaS), other cloud services (XaaS); on understanding the assignments and roles of leading vendors – Microsoft, Amazon, Google. The discipline is aimed at developing skills of working with Web applications for deployment in a cloud environment, with the transfer of existing applications to it, mastering programming techniques and system administration of applications deployed in the cloud, with virtualization technologies, Web application transactions, installing virtual servers to support them, working out security issues, scaling, deployment, backup in the context of cloud infrastructure.	6	ON2, ON3
PC UC				
65	Professional Kazakh (Russian) language PK(R)L B02	Within the framework of this discipline, the scientific style and its genre diversity, morphological and syntactic features of the scientific and technical style, rules for constructing a scientific text and language design, methods and techniques of structural-semantic and meaning-linguistic analysis of professional text, features of the language system in professional communication , culture of speech in professional activities	5	ON1, ON3
66	Professionally oriented foreign Language POFL B02	In the framework of this discipline, the issues of formation of linguistic, pragmatic and cognitive competencies, features of oral and written texts of scientific and technical nature in the specialty, strategy of communicative behavior in situations of international professional communication are studied	5	ON1, ON3
67	Methods of cryptography MC B02	Within the framework of this discipline, traditional symmetric cryptosystems, encryption by programming, modern symmetric cryptosystems, asymmetric cryptosystems are studied	4	ON8, ON12
68	Pregraduation internship PI B01	A pre-degree internship is the first preliminary stage of a diploma project. It is an opportunity for students to demonstrate their theoretical knowledge of the programme to a potential employer and to prepare for the writing of their thesis/project.	8	
69	Practical Internship – III PI(III) B01	The internship will allow the learner to consolidate possession of professional skills in a specialty, gain experience in a professional team, gain initial skills in solving practical problems, study the procedure for analyzing the main economic indicators of enterprises, take part in developing relevant reports and documents, consolidate methods, techniques and	4	ON1, ON3, ON14

		methods economic calculations, to develop skills in the preparation of basic financial documents.		

******The same numbers in the discipline code indicate belonging to the same module.*

7. The curriculum of the educational program for the entire period of study*

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