TURAN-ASTANA UNIVERSITY

APPROVED

at a meeting of the Academic Council Turan-Astana University Minutes № <u>7</u> «<u>22</u> » <u>02</u> 2023 г Chairman of the Academic Council

_____professor G.A. Japarova

CATALOG OF ELECTIVE DISCIPLINES 6B06101-"INFORMATION SYSTEMS" THE PERIOD OF STUDY IS 4 YEARS (ADMISSION - 2023)

ASTANA, 2023

Catalog of elective disciplines OP 6B06101 - Information Systems

Module code	Module name	Discipline code	Name of disciplines	Executive Summary	Number of credits (KZ/ ECTS)	Semester	Prerequisites	Post requisites	Expected results of study of the discipline
1	2	3	4	5	6	7	8	9	10
				Basic discip	lines				
				Optional comp	oonent				
	Special "Software Technology"	TPO	Software testing	The purpose of the discipline: to teach students the methods and technologies of testing, which will allow them to ensure the quality of the software product and improve its reliability and efficiency. This discipline studies: Fundamentals of software testing. Test automation. Testing of web applications. Testing of mobile applications. Security testing.	5/5	4	Fundamentals of algorithms and programming	Advanced Python Programming	 1.knowledge acquired by students: to use testing methods and tools; to create test cases and correct errors. 2. Skills acquired by students: understand the life cycle of software testing; work with databases. 3.skills and competencies acquired by students: analyze and present test results; develop test cases.
	Special "Software Technology"	TMP	Testing of multimedia applications (including computer games)	The purpose of the discipline: to teach students methods of testing computer games and multimedia applications, including testing functionality, performance, security and user interface. This discipline studies: Basic concepts of multimedia application testing. Life cycle of multimedia application testing. Testing the functional requirements of multimedia applications.	5/5	4	Fundamentals of algorithms and programming	Advanced Python Programming	 1.knowledge acquired by students: to test multimedia products; to use testing methods and tools; 2.skills acquired by students: analyze test results; work in a team with developers. 3.skills and competencies acquired by students: create a test case; work with test environments.
	Special "Fundamentals	ChM	Numerical methods	The purpose of the discipline: learn to apply numerical algorithms	5/5	5	Mathematics, discrete	Repair of modern	1.knowledge acquired by students: to navigate the flow

of mathematical algorithms"			to solve mathematical problems, as well as assess the accuracy of the results. This discipline studies : Methods for solving systems of linear algebraic equations; Approximate methods for solving nonlinear equations; Interpolation by polynomials; Numerical differentiation; Quadrature formulas.			mathematics	computers and laptops	of information about numerical methods, to be able to apply them practically to specific applied tasks; evaluate errors of applied methods, implement computational algorithms in a high-level programming language. 2.skills acquired by students: to apply numerical methods and bring the solution of various classes of problems to numbers 3.skills and competencies acquired by students: apply numerical in solving various applied problems.
Special "Fundamentals of mathematical algorithms"	KAG	Computer algebra and geometry	 The purpose of the discipline: mastering the skills of using computer tools to solve algebraic and geometric problems, as well as the development of abstract thinking and logical thinking. This discipline studies: Groupoids - sets with one binary operation; Ringoids - sets with two binary operations; Morphisms of algebraic structures. 	5/5	5	Mathematics, discrete mathematics	Repair and maintenance of personal computers	 1.knowledge acquired by students: to define the basic concepts and formulate the basic theorems with examples, the basics of programming on the Wolfram mathematica platform. 2. skills acquired by students: solve computational and theoretical problems in the field of group theory and field theory, programming in Mathematica. 3.skills and competencies acquired by students: to solve problems using the mathematical apparatus of group theory, field theory, analytical methods of algebraic structures.
Special "Software Technology"	PU	UML programming	The purpose of the discipline: learn to use standard graphical notation UML to describe and design object-oriented software systems, improve the quality of their analysis, design and development. This discipline studies: Basics of UML: class diagrams, sequence	5/5	6	New programming technologies	Advanced Python Programming	1.knowledge acquired by students: to program in UML: structural and behavioral diagrams, their elements and purpose; understand the process of software development and the role of UML in this process. 2. skills acquired by students: create class diagrams, sequence

			diagrams, state diagrams and others. Designing application architecture using UML. Designing databases using UML.					diagrams, state diagrams, and activity diagrams according to the requirements of the project. 3. skills and competencies acquired by students: use UML-diagrams to document and communicate with other project participants; design systems using UML-diagrams; understand the principles of modular programming and create modular systems using UML diagrams
Special "Computer Graphics"	КМ	Computer simulation	 The purpose of the discipline: in mastering the skills to create mathematical and computer models of real systems and processes to analyze, predict and optimize their behavior and functioning. This discipline studies: Mathematical methods used in computer modeling. Programming in the languages used in modeling. Methods and tools for visualizing simulation results. 	5/5	6	New programming technologies	Computer graphics and 3D visualization	1.knowledgeacquiredbystudents:to choose the mostappropriatemethodsofmodelingfora particularproblem; analyze and interprettheresultsofmodeling.acquired by students:toassessthetoassessthequalityofmodelinganditsaccuracy;programandcomputermodels;3.skillsandcompetenciesacquiredacquiredbystudents:usecomputerrogramstovisualizeandanalyzesimulationresults.
			Major discip	lines				
			Optional comp	oonent	-			
Special "Software Technology"	ΤΟΟΡ	Object Oriented Programming Technology	The purpose of the discipline: in mastering the principles, methods and tools of object-oriented programming to develop high- quality, modular and extensible software applications. This discipline studies: Object- oriented environment C++. Features of the OOP. C++ language. Simple, enumerated, interval and structural data types. Classes. Library of visual components.	4/4	3	Fundamentals of algorithms and programming	Advanced Python Programming	 knowledge acquired by students: to use methods of structural and object-oriented programming; to observe the principles of design organization and the content of the stages of the software development process. skills acquired by students: to develop and implement algorithms to solve problems using the mathematical apparatus; apply the principles of procedural and object- oriented approaches in programming problems,

								developapplications.3.skillsandcompetenciesacquiredbystudents:toprograminmodernenvironments;to usemodernmethodsofobject-orientedprogrammingincodingsoftwaresystemsofdifferentlevels ofcomplexity.
Special "Software Technology"	PYaVU	Programming in high-level languages	 The purpose of the discipline: aimed at acquiring skills in developing programs using modern programming languages to solve practical problems. This discipline studies: Introduction to programming in high-level languages. Data types. Operations on data. Syntax of high-level languages. Basics of algorithm development. Object-oriented programming and patterns. 	4/4	3	Fundamentals of algorithms and programming	C# programming	 knowledge acquired by students: to use terminology and basic definitions regarding the discipline studied; basic static and dynamic data types; basic tool environments for creating software in high-level languages skills acquired by students: solve typical problems in programming automation systems in high-level languages, including the use of specialized packages and libraries skills and competencies acquired by students: to develop complexes of hardware, algorithms and software for modern automation systems of technological processes using high-level languages for error detection and software optimization
Special "Computer Graphics"	PP3DP	Production of products on a 3D printer	 The purpose of the discipline: to master the knowledge and practical skills of working with 3D-printing software and hardware to create prototypes and finished products. This discipline studies: Geometric modeling. Basic concepts of three-dimensional computer modeling. Software for three-dimensional modeling. Object models. Methods of three-dimensional computer modeling. 	5/5	5	Information and communicatio n technologies	Basics of WEB design and WEB programming	1. knowledge acquired by students: to use the basic concepts and terms of geometric modeling to the extent necessary for practical use; key concepts of three-dimensional modeling; terms used in three- dimensional modeling; software for three-dimensional modeling; elements of models processed by the software. 2.skills acquired by students: to formalize obtained working results in the form of

								presentations, scientific and technical reports, articles and reports at scientific and technical conferences; to solve the problems of developing an algorithm for creating three- dimensional models in a coordinated manner 3.skills and competencies acquired by students: to create three-dimensional models by different methods.
Special "Computer Graphics"	S3DS	Scanning on a 3D scanner	The purpose of the discipline: mastering the skills of creating three-dimensional models, visualization and animation of objects using computer technology for use in various fields, including architecture, multimedia, game industry and many others. This discipline studies: Representation of color in the computer. Fractals. Rasterization algorithms. Raster processing algorithms. Image filtering. Vectorization. Two-dimensional transformations. Space transformations.	5/5	5	Information and communicatio n technologies	Application design and development	 knowledge acquired by students: demonstrate methods and tools of computer graphics and geometric modeling; basics of vector and raster graphics; theoretical aspects of fractal graphics; basic methods of computer geometry; algorithmic and mathematical basics of building realistic scenes; solve problems of implementing computer graphics algorithms using an electronic computer. skills acquired by students: software implementation of the basic algorithms of raster and vector graphics; use of graphic standards and libraries. skills and competencies acquired by students: develop models of components of information systems, including database models; develop components of software systems and databases, use modern programming tools and technologies; justify the design decisions made, to set up and carry out experiments to test their correctness and effectiveness.
Special "Computer Graphics"	SPSV	Creating an application in the	The purpose of the discipline: mastering the skills of developing software applications using Visual	4/4	3	Fundamentals of algorithms and	Advanced Python Programming	1. knowledge acquired by students: to apply intergrated packages for statistical data

 special Special			VisualStudio	Studio environment, which will			programming		processing, construction and
 Special Special PSERS Programming in Technology" The purpose of the discipline matering high-performance arguing high-performance applications, for operating systems, involved in creating client, creating high-performance applications, for operating systems, involved in creating client, server, multi-ier, cloud, web applications of windows, Android and iOS. This discipline studies: Software development of applications on the platform, the basis of software programming language. PSERS Programming in the purpose of the discipline matering high-performance applications for operating systems. This discipline studies: Software applications for operating systems. This discipline studies: Software and hardware encryption. Security of network operating systems. The matering high-performance application systems. This discipline studies: Software and hardware encryption. Security of network operating systems. This discipline studies: Software affinitive systems. Thi			environment	allow you to create high-quality and					calculation of mathematical
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This discipline studies: Software and hardware encryption. Security of network operating systems. Ensuring security in Windows, Unix systems. Intrusion detection systems. The main components of the architecture of firewalls.									web solutions.
Connect RAD Studio to various database servers and enterprise data sources, and provide multilevel DataSnap technology. The current version of Embarcadero RAD Studio XE2 combines Delphi XE and C++ Builder XE2 into one integrated development environment.									2. skills acquired by students
database servers and enterprise network operating systems. Ensuring security in Windows, Unix systems. Intrusion detection systems. The main components of the architecture of firewalls.				and hardware anoruntion Security of					Connect RAD Studio to various
data sources, and provide multilevel DataSnap technology. The current version of Embarcadero RAD Studio XE2 combines Delphi XE and C++ Builder XE2 into one integrated development environment. 3 skills and competencies				network operating systems. Ensuring					database servers and enterprise
Security in Windows, Onix Systems.Intrusion detection systems. The main components of the architecture of firewalls.Intrusion detection systems. The main component systems. The of firewalls.Intrusion detection systems. The main component systems. The main component systems. The systems. The systems. The main component systems. The systems. The main component systems. The systems. T				security in Windows Unix systems					data sources, and provide
The current version of main components of the architecture of firewalls. The current version of Embarcadero RAD Studio XE2 combines Delphi XE and C++ Builder XE2 into one integrated development environment. 3 skills and competencies				Intrusion detection systems The					multilevel DataSnap technology.
of firewalls. Embarcadero RAD Studio XE2 combines Delphi XE and C++ Builder XE2 into one integrated development environment. 3 skills and competencies				main components of the architecture					The current version of
combines Delphi XE and C++ Builder XE2 into one integrated development environment. 3 skills and competencies				of firewalls.					Embarcadero RAD Studio XE2
Builder XE2 into one integrated development environment. 3 skills and competencies									combines Delphi XE and C++
acvelopment environment.									development
									3 skills and compatancies
acquired by students, create									acquired by students, create
console applications for									console applications for
acquired by students: create									acquired by students: create

Γ									Windows in the environment
_	Constal	DDD	A 1		<i></i>	4	Object	Constant	Embarcadero RAD Studio .
	Special "Software Technology"	PPP	Advanced Programming in Python	The purpose of the discipline: to expand knowledge and skills of programming in Python, to master advanced techniques and tools necessary to create complex high- level software systems. This discipline studies: Introduction to Python programming, syntax. Different styles of writing programs. Applications of Python language in different areas. Python for data analysis.	5/5	4	Object- oriented programming technology	Geographic information systems	 1.knowledge acquired by students: apply the syntax and structure of the Python language to data processing capabilities of built-in libraries and functions of the Python language, especially the organization of additional subroutines 2. skills acquired by students: to make programs using the syntax and structures of the language Python; apply built-in modules and functions Python for data processing to make their own programs and subprograms using both built-in and self-developed subprograms and modules in the language Python. 3. skills and competencies acquired by students: write program codes using Python language syntax and constructs with skills in using built-in Python modules and functions for data processing skills in designing, testing and subprograms using both built-in and independently developed Python language subprograms and subprograms using both built-in and independently developed Python language subprograms and modules
	Special "Software Technology"	PYaC	C# programming	 The purpose of the discipline: to master the language and principles of object-oriented programming, create applications for the .NET platform and develop software solutions using modern technologies. This discipline studies: Data types in C#. Types passed by value and by 	5/5	4	Programming in high-level languages	Logistics information systems	 knowledge acquired by students: to write programs in the C# programming language and apply the principles of .NET class libraries in program development and the concept of object-oriented programming; skills acquired by students: navigate the development tools for the C# language and technologies for working with

Special "Software Technology"	OS	Operating systems	reference. C# syntax and differences from C++. Structure of a C# program. The purpose of the discipline: mastering the knowledge and skills of working with the basic components of operating systems, computer resource management, improving performance and security of computer systems. This discipline studies: The purpose and functions of the operating system. Types of operating systems. The main components of an operating system. Files and directories. Processes and threads.	3/3	4	Information and communicatio n technologies	Cryptographic data protection	files, threads, databases, XML documents and user interface 3. skills and competencies acquired by students: develop applications; create a user interface. 1. knowledge acquired by students: to solve problems of functions, composition and principles of operating systems and architecture of modern operating systems; to describe the features of the construction and functioning of the families of operating systems Linux and Windows; to manage resources in the operating system. 2. skills acquired by students : to manage the boot parameters of the operating system; perform configuration of hardware devices; manage accounts, configure the user's working environment; manage disks and file systems, configure network settings, manage the division of resources in the local network 3. skills and competencies
	0.007							3. skills and competencies acquired by students: to install and work in the operating systems Linux.
Special "Software Technology"	OOSL	Linux operating system basics	The purpose of the discipline: acquiring knowledge and skills to work on the command line, managing the file system, setting up network connections and installing programs to work successfully in the Linux environment. This discipline studies: history of Unix and Linux operating systems. Virtual machines. Linux operating systems and their distributions. Linux operating system shells. Processes. Interaction of processes and synchronization. The file system	3/3	4	Information and communicatio n technologies	Security and database organization,	 Knowledge acquired by students: to know the background to the emergence of operating systems and the evolution of operating systems; Skills acquired by students: installing and configuring Linux operating systems; setting access rights to Linux operating system resources Skills and competencies to be acquired by students:

Special	TBD	Theory of	The purpose of the discipline: to	5/5	5	IT	Data structure	1. Knowledge acquired by
"Fundamentals		databases	master the theoretical knowledge and			optimization	and data	students: to show the basic
of Data			skills of database design and			tools and	management	schemes used in the design and
Science"			management to ensure the effective			methods	-	use of modern databases, have
			storage, organization and use of data					basic concepts of data
			in information systems.					management systems, skills of
								working with Access database
			This discipline studies: Theoretical,					management system and MS
			methodological and practical					SQL Server, understand the
			construction of relational database					problems of the subject area,
			systems based on relational algebra					freely oriented in the basic
			and the method of ER-diagrams,					concepts and concepts of
			methods of reducing database					databases
			structures to normal forms.					2. Skills acquired by students:
								to create databases using
								information technology and use
								in practical activities.
								3. Skills and competencies to
								be acquired by students: to
								build simple logical schemes to
								use relational database
								management systems; to design
								database schemes using ER
					_			diagram method.
Special	TTISP	IT tools in	The purpose of the discipline:	3/3	6	No-code	Database	1. Knowledge acquired by
Software		project creation	mastering the theoretical and			platform	programming/.	students: to build logical
Technology			practical knowledge necessary to					schemes of program-target and
			in IT projects					project-oriented management;
			in 11 projects.					modern menodologies of
								international and national
								standards: specifics of IT
								project management
			This discipline studies: Scientific					2 Skills acquired by students:
			and technical expertise of innovative					to define the concept of the
			projects. Diagnosis of innovative					project: to make a project
			technologies. Architecture and					charter and a project
			strategy of information technology					management plan: to identify
			of the enterprise. The main elements					the risks of the project -
			and stages of the development of IT-					knowledge of project
			strategy.					management standards: -
								knowledge of the basic
								principles and methods of
								project management and
								progress control;
								3. Skills and competencies to

								be acquired by students: to apply methods and standards of project management, to the current requirements and realities of the project, to assign resources to project activities, to update the project schedule, to monitor the progress of the project:
Special "Fundamentals of Data Science"	SDUD	Data structure and data management	 The purpose of the discipline: is to master the principles of organization, storage and processing of data for effective and convenient access to information, as well as to develop skills in designing and implementing databases. This discipline studies: Foundations of the theory of databases.Systems of database management. Overview of modern database management systems. Levels of representation of databases. Data models. Database languages. Normalization of relationships. 	3/3	6	IT optimization tools and methods	database concept	 Knowledge acquired by students: apply the basics of database theory; use the features of the relational model and their impact of database design, ensure consistency and integrity of data and database structure design tools. Skills acquired by students: to build a model of the subject area of the software and create a database corresponding to it; to organize data entry into databases and provide data manipulation; to formulate queries to the database. Skills and competencies to be acquired by students: to design relational databases; to implement in practice complex data structures (lists, hierarchies, networks) by means of relational database management system; to design the main stages of the life cycle of databases, support and maintenance, know the methodology of data backup.
Special "Software Technology"	NP	No-code platform	The purpose of the discipline: to master the tools to create applications and automate business processes without writing code, accelerate and simplify the	3/3	3	Information and communicatio n technologies	Technology for creating client- server applications Basics of WEB	1.Knowledge acquired by students: demonstrate the basics of database, mobile application, Web application, and computer graphics

Special "Software Technology"	IMOIT	IT optimization tools and methods	 development process and use their resources more efficiently. This discipline studies: Data Base in No Code- Airtable. Chatbots. Mobile applications without programming. Web applications without programming. Graphic design tools. Spark AR Studio. The purpose of the discipline: to master the skills of finding and applying effective tools and methods of optimization of information and technological systems to improve their efficiency and economic benefit. This discipline studies: Structural analysis and basics of process management. Modeling of organization activities and methods of analysis and optimization of business processes. Applied aspects of Process Mining. 	3/3	3	Information and communicatio n technologies	design and WEB programming Database theory Design and development of applications	 2. Skills acquired by students: to design and create functions, quickly develop applications without serious loss of quality. 3. Skills and competencies to be acquired by students: develop platforms without using code 1. Knowledge acquired by students: to know the basic methods and standards to describe, analyze and optimize the architecture and business processes of the enterprise; to demonstrate the basic methods of information systems and services management. 2. Skills acquired by students: describe, analyze and optimize business processes and enterprise architecture; identify business needs in order to determine how to meet them on the basis of information and communication technology. 3. Skills and competencies to be acquired by students: use skills to describe, analyze and optimize the business processes
Special "Software Technology"	OWDWP	Fundamentals of WEB design and WEB programming	The purpose of the discipline: to master the basic skills of web design and programming, to understand the principles of creating Web sites. This discipline studies: History and major trends in the development of Web-technologies. Hypertext	4/4	6	Information and communicatio n technologies	Mobile platforms and systems	 Knowledge acquired by students: function principles of organization, web technologies based on modern WEB- technologies using ASP.NET. Skills acquired by students be able to create software applications based on modern
Special "Software	PRP	Application design and	markup, the structure of HTML- document. Cascading style sheets CSS. JavaScript language. Dynamic HTML and the object model document. The purpose of the discipline: to master the skills of software design	4/4	6	Information and	Creating	Internet technologies; 3. Skills and competencies to be acquired by students: to create web-pages, as well as design and use them in practical activities. 1. Knowledge acquired by students: to build the principles

Technology"	development	and development to create a quality software product. This discipline studies: Basics of Web page creation. Hypertext links and illustrations on Web pages. Formatting of tables. Frames and forms. Installing and configuring PHP.			communicatio n technologies	applications based on the database	of Internet applications; basic principles of cross-browser layout; principles of data exchange between clients and the server on the Internet;. 2.skills acquired by students : to build a professional strategy for the development and implementation of web applications; to plan the architecture of web applications, taking into account current trends in development; to identify common characteristics of different types of data and process them using the principles of object-oriented design 3. Skills and competencies to be acquired by students : use algorithms and data structures to solve specific problems; apply
							the concepts of object-oriented programming practically; create and develop web-applications.
Special SAS "Software Technology"	System administration of networks	The purpose of the discipline: to teach students to manage, configure and maintain computer networks.Thisdisciplinestudies: virtualizationVirtualizationsystems.Modeling components of the enterprise system. Installation of additional software. Fundamentals of administration of the UNIX operating system. Setting up a dedicated UNIX-server. Network programming.	5/5	7	Repair of modern computers and laptops.	Cryptographic data protection/	 Knowledge acquired by students: demonstrate the stages of deployment of enterprise systems; apply virtualization systems in CIS. skills acquired by students: to install and configure a dedicated UNIX-server local network; to install virtualization systems and configure them; to develop network applications built on the client-server model. Skills and competencies to be acquired by students: to work with components of modern corporate systems and virtualization systems used in CIS.
SSS "Software Technology"	communications networks	discipline: to acquire knowledge of modern technologies and data	5/5	/	maintenance of personal	database organization	1. Knowledge acquired by students demonstrate the principles of the main types of

			transmission protocols.			computers		intelligent systems and basic algorithms for training artificial
								neural networks;
								2. skills acquired by students:
			This discipline studies: The subject					to work with modern
			of study of artificial intelligence.					neurosimulators and fuzzy
			Knowledge representation systems.					control systems; correctly
			structure Fundamentals of fuzzy					prepare data and train neural
			logic. Fuzzy inference systems.					algorithmic circuits.
			Fuzzy regulators. Neural networks.					3. Skills and competencies to
			Neural network control.					be acquired by students: to
								import data into
								neurosimulators and fuzzy
								control systems, to use tools that
								implement algorithms of
								artificial neural networks and
								fuzzy control; to apply various
								methods of artificial neural
								networks and fuzzy algorithms
								in automation.
Special	OIS	Bases of	The purpose of the discipline: to	4/4	6	Object-	Modern cloud	1.knowledge acquired by
Special "Software	OIS	Bases of information	The purpose of the discipline: to acquire the knowledge necessary for	4/4	6	Object- oriented	Modern cloud technologies	1.knowledge acquired by students: to make up the
Special "Software Technology"	OIS	Bases of information systems	The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization	1.knowledge acquired by students: to make up the structure of information
Special "Software Technology"	OIS	Bases of information systems	The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity.	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools: to have an idea of the
Special "Software Technology"	OIS	Bases of information systems	The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of the cycle o	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the manipulation systems. The concept of the manipulation systems. The concept of the manipulation systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students:
Special "Software Technology"	OIS	Bases of information systems	The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system.
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems 3. Skills and competencies to
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems 3. Skills and competencies to be acquired by students: to form the objectives of the students: to be acquired by students: to form the objectives of the students: to be acquired by students: to form the objectives of the students: to form the objectives of the students:
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems 3. Skills and competencies to be acquired by students: to form the objectives of the information system.
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems 3. Skills and competencies to be acquired by students: to form the objectives of the information system, to determine the conceptual model of the students: to be acquired by students: to be acquired by students: to form the objectives of the information system, to determine the conceptual model
Special "Software Technology"	OIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. 	4/4	6	Object- oriented programming technology	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems 3. Skills and competencies to be acquired by students: to form the objectives of the information system, to determine the conceptual model of information system, to form the objectives of the information system, to determine the conceptual model of information system.
Special "Software Technology" Special	UIS	Bases of information systems	 The purpose of the discipline: to acquire the knowledge necessary for and the use of information systems in various fields of activity. This discipline studies: Information system as the main part of the management system. The objectives of systems theory. The life cycle of information systems. The concept of the project and information about project management. The methodology and technology of the development of information systems. The purpose of the discipline: to 	4/4	6	Object- oriented programming technology Programming	Modern cloud technologies and virtualization systems	 1.knowledge acquired by students: to make up the structure of information systems, technical and software tools; to have an idea of the structure of the information process and know the basics of organizing information processes 2.skills acquired by students: to use systems analysis in the formulation and algorithmic tasks of the information system, to determine the conceptual model of information systems 3. Skills and competencies to be acquired by students: to form the objectives of the information system, to determine the conceptual model of information system, to determine the conceptual model of information system.

Technology"			technology and systems to improve business processes and increase the competitiveness of organizations. This discipline studies: Fundamentals of information system service management. Functional areas of information system service management. The organizational structure of the information system service. Information system service functions and information technology service parameters. Information system service processes and overcoming the limitations of the functional approach.			languages	computing	concepts of ITSM; basic approaches to information technology and information system management; basic international standards in the field of information technology management; methods of organizing HelpDesk and ServiceDesk services and requirements for these services 2. skills acquired by students: to identify and re-engineer business processes of information technology management; plan the implementation of international standards in the field of information technology management; choose software tools for automation of IT management 3. Skills and competencies to
								be acquired by students: to use modern software tools designed to automate the management of
Special "Software Technology"	PS1CP	Programming in 1C:Enterprise environment	The purpose of the discipline: to master the skills of creating software solutions in the language 1C and development of application software for the automation of business processes. This discipline studies: An introduction to the 1C software system. Objects of the programming configuration. The palette of properties. The main constructions of 1C. Internationalization. Reference books. General methods of working with directories.	5/5	5	No-code platform	Writing a thesis (project)	 Knowledge acquired by students: to demonstrate the basics of the embedded language, programming and configuration methods of the system; technological platform and components of the system "1C: Enterprise skills acquired by students: to form automatically operations by primary documents (invoices, demands, cash vouchers, advance reports, etc.); use standard operations; generate various reports; perform routine operations; obtain various analytical information; automate the input of standard operations, enabling

								the user to automate the input of frequently recurring operations. 3. Skills and competencies to be acquired by students: to conduct a comparative analysis of software products and development tools; to develop information system modules in accordance with the terms of reference; to administer databases within their competence; to use information technology in professional activities
Special "Software Technology"	RP1C	Development of 1C applications	 The purpose of the discipline: to acquire the skills to create and configure information systems on a platform 1C to automate business processes in organizations. This discipline studies: Theory of accounting for the programmer. The software platform of the system 1C: Enterprise. Configurator. Export - import of XBASE data (DBF file). Performing work on the transfer of data using text files. 	5/5	5	IT optimization tools and methods	Writing a thesis (project)	 knowledge acquired by students: to know the basic concepts and principles of functioning of the system "1C. skills acquired by students: to make changes to the composition of standard configurations and develop configurations "from scratch". Skills and competencies acquired by students: perform development of specifications of individual components; perform development of software product code on the basis of ready-made specifications at module level; perform optimization of module's program code.

Special	RSKN	Repair of	The purpose of the discipline:	3/3	3	Information	Modern cloud	1. knowledge acquired by
"Software		modern	gaining knowledge and skills to		_	and	technologies	students: to demonstrate
Technology"		computers and	diagnose and troubleshoot problems			communicatio	and	systematic knowledge of the
		laptops	in modern computers and laptops to			n technologies	virtualization	architecture of computer
			ensure their smooth operation.			_	systems	systems, organization and basic
			-					principles of operation of
								electronic computer devices, in
								particular storage devices,
								processors and computer
			This discipline studies: Definition,					complexes in general.
			purpose, main characteristics and					2. skills acquired by students:
			classification of a computer. Ways of					to use the knowledge of the
			organizing memory. Ways of					architecture of computer
			increasing memory capacity.					systems, memory devices,
			Operational memory (RAM).					processor systems; possess the
								ability to design functional units
								and skills of technical
								implementation and
								modernization of electronic
								computers and their
								components.
								3. Skills and competencies
								acquired by students: master
								the architectural features of
								modern computers and
								computer systems; the basics of
								the organization of computing
								complexes.
Special	POPK	Repair and	The purpose of the discipline: to	3/3	3	Information	Fundamentals	1. knowledge acquired by
"Software		maintenance of	master the practical skills of			and	of cloud	students: to know the
Technology"		personal	maintenance, diagnosis and repair of			communicatio	computing	introduction of computer
		computers	computers.			n technologies		equipment and computer office
								equipment in the operation of
								the workplace users, diagnostics
								of performance and
			This discipline studies. The					maintenance of computer office
			composition purpose and technical					equipment.
			characteristics of the functional basic					2. skills acquired by students:
			units of personal computers					choose the hardware
			Diagnosis and operation of					configuration of a personal
			computers. Troubleshooting and					computer, server of peripheral
			failures of hardware of personal					devices, computer office
			computers.					equipment, adjust and maintain
			T. T.					the parameters of the
								functioning of hardware,
								troubleshoot problems and

								 failures in the work of the hardware 3. Skills and competencies acquired by students: to maintain the device of personal computer and servers; install BIOS for personal computer and servers.
Special "Software Technology"	GS	Geographic information systems	 The purpose of the discipline: mastering the knowledge of modern technologies of information systems focused on the analysis of spatial (geographical) data. This discipline studies: Basic concepts of geoinformatics. Areas of application of geographic information systems. Spatial elements Map - model representations of reality. The cartographic process. 	4/4	6	Fundamentals of algorithms and programming	Writing and defending a thesis (project)	 knowledge acquired by students: specify the basic provisions of geoinformatics basic principles of organization and functioning of geographic information systems; data representation models in geographic information systems; data input/output technologies in geographic information systems; basics of spatial data analysis in geographic information systems; skills acquired by students: to mark up geographical information; to perform the stages of work on the creation of a digital map base; to create projects in the environment of a typical geographic information system to analyze spatial data. Skills and competencies acquired by students: Demonstrate skills in the environment of a typical geographic information system; methods of markup of geographic information.
Special "Software Technology"	ISL	Logistics information systems	The purpose of the discipline: To master the knowledge and skills in the design, development and use of information systems used in logistics in order to improve the efficiency and optimization of logistics processes.	4/4	6	Fundamentals of algorithms and programming	Writing and defending a thesis (project)	1. Knowledge acquired by students: Demonstrate the basics of logistics management and its interaction with information technology. Architecture of information systems in logistics and their components Methods of design, development and

					implementation of information
		This discipline studies: The basics			2. Skills acquired by students:
		of logistics and logistics			Design, develop and implement
		management. Principles and methods			logistics problems. Analyze and
		logistics. Information technology in			optimize logistics processes
		logistics: enterprise resource			using information systems.
		planning systems (ERP), supply chain management systems (SCM).			acquired by students: Design
					the development of information
					systems for logistics tasks. Skills in analysis and
					optimization of logistic
					processes using information
					different information
					technologies in logistics;
					Competence in selecting and configuring software for solving
					logistic problems.

Special	ES	Expert Systems	The purpose of the discipline:	5/5	7	Advanced	Production /	1. Knowledge acquired by
"Software						Python	Pre-diploma	students: demonstrate the
Technology			Gaining knowledge and practical			Programming	internship,	basics of expert systems and
			skills in the creation and use of				writing	artificial intelligence; Principles
			expert systems to solve complex				thesis (project)	and methods of creating and
			problems in various fields, including					Mothods of basis and intelligent
			business, science and technology.					data analysis for decision
								support
								2 Skills acquired by students.
								Development of expert systems
			This discipline studies:					and their components:
								Evaluation of the effectiveness
			Introduction to expert systems: basic					of expert systems and choosing
			concepts and concepts, applications					the most appropriate for a
			and examples. Stages of developing					particular task; Analysis and
			expert systems: from defining					modeling of expert knowledge;
			requirements to creating and testing					Preparation of data for creating
			the system.					and training of expert systems.
								3. Skills and competencies
								acquired by students: Ability
								to choose and apply the most
								appropriate methods and
								algorithms to create expert
								systems. Addity to design and
								solving problems in various
								fields: Skills to work with
								modern tools and technologies
								used in expert systems:
								,
Special	MOP	Machine	The purpose of the discipline:	5/5	7	C#	Production /	1.Knowledge acquired by
"Software		oriented	mastering the theoretical foundations			programming	Pre-diploma	students: demonstrate basic
Technology"		programming	and algorithms of machine learning,				internship,	principles, methods, and tasks
			their possible practical				Writing	of machine learning; logical
			implementation and application in				thesis (project)	models of machine learning;
			solving problems.					metric models of machine
								machine looring
								2 Skills acquired by students:
								to apply the studied methods of
			This discipline studies: Introduction					machine learning in solving
			to machine learning. Logical models					practical problems
			of machine learning. Decision trees.					3. Skills and competencies
			Kanking trees. Learning ordered rule					acquired by students:
			lists.					development of data analysis

								tools, machine learning metric models. Use of artificial neural
Special "Software Technology"	MPS	Mobile platforms and systems	 The purpose of the discipline: to master the knowledge and practical skills in the development of mobile applications for different platforms and devices. This discipline studies: the architecture of mobile devices and operating systems; programming languages, frameworks and tools for mobile application development; 	5/5	7	Tools and components for 3D printing	Writing a thesis	 I. Knowledge acquired by students: demonstrate the architecture of mobile devices and operating systems; Fundamentals of programming mobile applications; Methods of developing and testing mobile applications; Features of user interface design for mobile devices; 2. Skills acquired by students: Design and develop mobile applications; Develop user interface for mobile devices; Use modern tools and tools for mobile application 3. Skills and competencies acquired by students: work with tools and means of mobile application development; work in a team of
Special "Fundamentals of Data Science"	SAPOBD	Building analytical applications based on the database	 The purpose of the discipline: is to acquire knowledge and skills to create effective analytical applications, using databases as a basis for data storage and processing. This discipline studies: Basics of Web Page Creation. Hypertext links and illustrations on Web pages. Formatting of tables. Frames and forms. 	5/5	7	Computer graphics and 3D visualization	Writing a thesis	mobile application developers; 1. Knowledge acquired by students: to demonstrate the principles of Internet applications; basic principles of cross-browser layout; principles of data exchange between clients and the server on the Internet: o addressing rules for devices in the network; o HTTP protocol; data transfer formats: o JSON; o XML. 2. Skills acquired by students: professionally build a strategy for the development and implementation of web applications; plan the architecture of web applications, taking into account current trends in development; identify common characteristics in data of different types and process

								them using the principles of object-oriented design. 3. Skills and competencies acquired by students : to use the skills of practical algorithms and data structures in solving specific problems; skills of practical application of the concepts of object-oriented programming; practical work on creating and developing web applications.
Special "Fundamentals of Data Science"	TOHBD	Technological processing and storage of big data	 The purpose of the discipline: to master the knowledge and practical skills of working with large volumes of data, learn to select and apply appropriate tools for their processing and storage. This discipline studies: Big-Data. Tools. Technologies. Methods of analysis. Predictive modeling. Area of applied tasks using predictive modeling. 	5/5	7	Database programming	Production/pre- diploma internship, writing a thesis (project)	 1.Knowledge acquired by students: demonstrate basic concepts of Big Data technology; basic concepts of forecasting; basic forecasting technologies. 2.skills acquired by students: to identify arrays of big data; to analyze clusters of big data; to make various forecasts of the development of socio-political processes. 3.skills and competencies acquired by students: knowledge of Big data technologies to create and maintain big data;
Special "Software Technology"	ITM	IT-Management	The purpose of the discipline: is to master the knowledge and skills necessary to organize and manage information technology in the company, ensuring its effective functioning and development.Thisdisciplinestudies: studies: Virtualization systems. Modeling components of the enterprise system. Installation of additional software. Fundamentals of administration of UNIX operating systems. Setting up a dedicated UNIX-server. Network programming.	5/5	7	The concept of a database	Writing a thesis	 Knowledge acquired by students: to demonstrate the stages of deployment of corporate systems; The role of freely distributable software in corporate information systems; Application of virtualization systems in corporate information systems; Fundamentals of administration of operating system UNIX; Fundamentals of network programming. 2.skills acquired by students Install and configure a dedicated UNIX server on the local network4 Install virtualization

								systems and configure them Develop network applications built on the client-server model. 3. skills and competencies acquired by students : Work with components of modern corporate systems; Work with virtualization systems used in the corporate information system.
"Fundamentals of Data Science"	PBD	programming	 The purpose of the discipline: mastering the skills of designing, creating and managing databases using the SQL language and modern programming tools to work effectively with data in a variety of applications. This discipline studies: The basics of constructing databases. Means of ensuring the security of databases. Physical implementation of databases security. Management of data access rights. 	4/4	8	programming	Production/pre- diploma internship, writing a thesis (project)	 Knowledge acquired by students: demonstrate basic methods of data description and technology: analysis of information resources of the subject area; development of data models, design and maintenance of the database and its security. skills acquired by students: to design a secure database; to analyze the degree of protection of the database and increase the level of protection, taking into account the development of mathematical and software computing systems; to use the tools to control the integrity of information, the organization of interaction with the database management system, backup and recovery of databases. skills and competencies acquired by students: to conduct activities on the design and maintenance of secure databases; organize activities to ensure safe processing of information on computer equipment using secure databases; making decisions on actions in emergency situations arising during the operation of secure databases; independent study and development of new

								methods and means of protection of databases.
Special "Fundamentals of Data Science"	KBD	Database concept	 The purpose of the discipline: to master the basic principles of organization and data management, as well as to develop effective databases for the analysis of information. This discipline studies: Fundamentals of databases. Data models. Database schemes. Structured query language (SQL). Normalization of databases. 	4/40	8	The concept of a database	Production/pre- diploma internship, writing a thesis (project)	 1.Knowledge acquired by students: demonstrate basic concepts of Big Data technology; basic concepts of forecasting; basic forecasting technologies. 2.skills acquired by students: to identify arrays of big data; to analyze clusters of big data; to make various forecasts of the development of socio-political processes. 3. skills and competencies acquired by students: master the modern technologies of data creation and maintenance in SQL.
Special "Fundamentals of Data Science"	IAD	Intelligent data analysis	 The purpose of the discipline: to acquire knowledge and skills to process, analyze and extract meaningful knowledge from large amounts of data using modern methods of machine learning and data analysis. This discipline studies: The subject of study of artificial intelligence. Knowledge representation systems. Definitions, classification, structure. Fundamentals of fuzzy logic. Fuzzy inference systems. Fuzzy regulators. Neural networks. 	5/5	7	Big data processing and storage technologies/	Production/pre- diploma internship, writing a thesis (project)	 Knowledge acquired by students: demonstrate the principles of the main types of intelligent systems; basic algorithms for training artificial neural networks and fuzzy algorithms; software and hardware methods for implementing artificial neural networks and fuzzy control algorithms. skills acquired by students: to work with modern neurosimulators and fuzzy control systems; correctly prepare data and train neural algorithmic circuits. skills and competencies acquired by students: import data into neurosimulators and fuzzy control systems, use of tools that implement algorithms of artificial neural networks and fuzzy control.

	Special	MAD	Data analysis	The purpose of the discipline:	4/4	8	IT	Production/pre-	1.knowledge acquired by
	"Fundamentals		methods	mastering the basics of the			Management	diploma	students: to demonstrate basic
	of Data			organization of databases and				internship,	methods of describing data and
	Science"			computer networks.				writing a thesis	_
								(project)	technologies: analysis of
									information resources of the
									subject area: development of
				This dissipling studies. The basics					data models design and
				of constructing detabases. Means of					maintenance of the database and
				of constructing databases. Means of					its security
				Distribution of the security of databases.					2 skills acquired by students:
				Physical implementation of database					to design a secure database: to
				security. Management of data access					analyze the degree of protection
				rights.					of the database and increase the
									level of protection taking into
									account the development of
									mathematical and software
									computing systems: to use the
									tools to control the integrity of
									information organize
									interaction with the database
									management system backup
									and recovery of databases
									3 skills and competencies
									acquired by students
									collecting processing and
									interpreting data: working with
									various methods of statistical
									analysis, machine learning and
									data visualization.
	Special	SOTSV	Modern cloud	The purpose of the discipline: to	6/6	8	Information	Writing a	1.knowledge acquired by
	"Artificial	20121	technologies	gain theoretical knowledge and	0, 0	Ũ	and	thesis (project)	students: demonstrate goals
	Intelligence"		and	practical skills on the architecture of			communicatio	ulesis (project)	and objectives of cloud
	intenigence		virtualization	"cloud" technology methods and			n technologies		technologies prerequisites of
			systems	features of designing "cloud"			n teennologies		migration to the cloud basic
			systems	services					concepts functions and trends
									of development of cloud
									technologies types of cloud
									architectures
									2 skills acquired by students
				This discipline studies: "Cloud"					to identify automated and
				Computing. The main characteristics					business processes that are more
				of Scaling. Elasticity. Multitenancy.					effective to move to the clouds
				Fault tolerance.					to assess the possible risks of
									using cloud technology to
									choose the optimal strategy for
L									encose the optimal suategy for

								the transition to cloud technology 3.skills and competencies to be acquired by students: determine methods to assess the cost of software systems in the clouds methods to develop a strategy for the company to use the cloud technology
Special "Artificial Intelligence"	OOV	Cloud computing bases	 The purpose of the discipline: an introduction to Amazon Web Services (AWS) and the technologies necessary to create virtual environments. This discipline studies: Introduction to Cloud Technology. Introduction to Linux. Command line utilities for working in Linux. Bash command interpreter. Networking technologies. Virtualization. OpenStack basics. 	6/6	8	Information and communicatio n technologies	Writing a thesis (project)	1. knowledge acquired by students: Demonstrate the basic concepts and principles of operating systems Basic virtualization, the principles of standard Linux utilities; the principle of basic network protocols Syntax and basic bash shell commands; application tools of network diagnostics 2.skills acquired by students: set up the Linux operating system Create and run virtual machines in Linux; use standard command line utilities; set up basic network protocols; write scripts for the bash shell; diagnose basic network errors 3.skills and competencies acquired by students: work in the operating system Linux; manage the life cycle of virtual machines; work with standard command line utilities.
Special "Fundamentals of Data Science"	KZD	Cryptographic data protection	 The purpose of the discipline: to gain knowledge about the benefits of cryptographic protection of information and the mathematical foundations of cryptography. This discipline studies: Basic concepts of cryptography. The simplest methods of encryption with a private key. The principles of building block ciphers with a private key. Encryption algorithms DES and AES. 	5/5	7	Mathematics	Writing a thesis (project)	 Knowledge acquired by students: demonstrate the mathematical foundations of cryptography; principles of symmetric and asymmetric cryptography; principles of electronic digital signature; principles of cryptanalysis. skills acquired by students: to choose cryptoalgorithms to solve specific tasks; to apply

								cryptography algorithms to
								protect information.
								3. skills and competencies
								acquired by students:: to
								implement in practice
								cryptographic algorithms to
								protect information.
 Special	BOBD/.	Security and	The purpose of the discipline: to	5/5	7	Mathematics	Writing a	1. Knowledge acquired by
"Fundamentals		database	acquire the necessary theoretical				thesis (project)	students: to demonstrate the
of Data		organization	knowledge of information security of					general statements of the
Science"			computer systems and networks, as					problem of information security
			systems from unauthorized access					of computer systems and
			systems from undurorized decess.					networks and the classification
								of methods of its solution; ways
								of unauthorized access to
			This discipline studies: The main					computer information and
			threats to the security of automated					methods of user authentication.
			information processing systems.					2. skills acquired by students:
			Encryption by gamification method.					analyze threats and factors
			Asymmetric cryptosystems.					affecting the security of
			authentication and electronic digital					information of computer
			signature.					systems and networks; create a
			0					plan for the protection of
								information objects and their
								information interaction; select
								and apply a reasonable means of
								protection; update the security
								system using update services;
								plan security policy.
								3. skills and competencies
								acquired by students: the use
								of methods and means of
								cryptographic protection of
								information and their
								application against malicious
								programs.

1) Considered at the meeting of the Department of "Information Technology", Minutes №____ of ____ 2022

2) Discussed and recommended at the meeting of the SchBIT Academic Committee, Minutes No. ____ of _____2023

3) The catalog of elective disciplines has been agreed upon:

Nº	Agreed with employers (name of organization, position, full name)					
1	National Information Technologies JSC, Chairman of the Board - A.N. Turysov.					
2	LLP "Kvarta LTD", Director - V.S. Andreev.					
3	IT integra LLP, Branch Director - Ryabtsev D.N.					
4	Agile Technologies LLP, Director - Zhilkibayev D.B.					

Head of the Department ______ Acting E.L. Nuspekov

Dean_____ R.A.Aimkulov