



2. CONTENT OF THE EDUCATIONAL PROGRAM

№	Module name	Acad. credits	№	Discipline code and name	Acad. credit discipline.	Cycle/ component
1	GES -1 General education module	36	1	GES 101 History of Kazakhstan	5	GC/ CC
			2	GES 102 Philosophy	5	GC/ CC
			3	GES 103 Social and Political Knowledge Module (Sociology, Cultural Studies, Political Science, Psychology)	8	GC/ CC
			4	GES 1(2)04 Physical Culture	8	GC/ CC
			5	GES 205 Information and communication technology	5	GC/ CC
			6	1. GES 106 Fundamentals of Legal Literacy and Anti-Corruption culture 2. GES 106 Fundamentals of Ecology and Safe life 3. GES 106 Fundamentals of Economics and Entrepreneurship/ 4. GES 106 Fundamentals of Leadership and receptivity to innovation 5. GES 106 Emotional Intellect 6. GES 106 Fundamentals of mathematical statistics	5	GC/ OC
2	GLC -2 Language communication	25	1	GLC 101 Kazakh (Russian) Language	10	GC/ CC
			2	GLC 102 Foreign Language	10	GC/ CC
			3	GLC 203 English for Academic Purposes	5	CC/ UC
3	GER – 3 Global ethics and research	22	1	GER 201 Inclusive education	6	CC/ UC
			2	GER 402/2 Fundamentals of scientific research	10	CC/ UC
			3	GER 303 Professional ethics and identity	6	ПД/ BK
4	FSCI - 4 Fundamental Science	25	1	FSCI 101 Designing algorithms	6	CC/ UC
			2	1. FSCI 102/1 Higher Mathematics 1. FSCI 102/2 Linear Algebra and Analytical Geometry	5	CC/ OC
			3	1. FSCI 203/1 Discrete Mathematics and Mathematical Logic 2. FSCI 203/2 Probability Theory and Mathematical Statistics	6	CC/ OC
			4	FSCI 204 Information Technology Hardware	6	CC/ UC
			5	TP 105 Training practice	2	CC/ UC



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5	PLT-5 Programming Languages and Technologies	32	1	PLT 201 Object-oriented programming	6	CC/ UC
			2	PLT 302 Programming language JAVA	6	CC/ UC
			3	PLT 403 Parallel Programming	4	MD/ UC
			4	1. PLT 304/1 Web Application Programming 2. PLT 304/2 Methods for Developing Web Applications	5	CC/ OC
			5	PLT 205 Databases	5	CC/ UC
			6	TP 206 Training practice	2	CC/ UC
			7	PP 307 Production practice	4	CC/ UC
6	DAET-6 Digital analytical educational technologies	21	1	1. DAET 301/1 Designing Mobile Applications 2. DAET 301/2 Development and Creation of Computer Games	5	MD/ OC
			2	1. DAET 202/1 Machine Learning 2. DAET 202/2 Fundamentals of Artificial Intelligence	5	CC/ OC
			3	DAET 403 IT Project Management	5	MD/ UC
			4	1. DAET 304/1 Design of Information Systems 2. DAET 304/2 Analytical Software	6	MD/ OC
7	ITES-7 Innovative technologies in the educational system	19	1	1. ITES 301/1 Web Analytics 2. ITES 301/2 Digital Transformation of the Education System	6	MD/ OC
			2	ITES 302 Information and Analytical Systems	6	MD/ UC
			3	ITES 303 Educational Data Mining	5	CC/ UC
			4	P(P)P 404 Pre-diploma (Production) practice	2	MD/ UC
8	ISDMS-8 Information security and database management system	27	1	ISDMS 301 Cyber Security and Attack Vectors	6	MD/ UC
			2	1. ISDMS 202/1 Client-server Technologies 2. ISDMS 202/1 BigData	5	CC/ OC
			3	PP 403 Production practice	16	MD/ UC
9	CNM-9 Computer networks and modeling	10	1	1. CNM 301/1 Computer network design 2. CNM 301/2 Computer Networks and Cloud Technologies	5	CC/ OC
			2	1. CNM 202/1 Modeling and design in education 2. CNM 202/1 Mathematical and Computer Modeling	5	CC/ OC
10		15	1	DChR 402 Design of robots and robotic systems	5	CC/ OC



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	DChR-10 Designer of children's robotics		2	DChR 403 Multimedia technologies	5	CC/ OC
			3	DChR 404 Software for mechatronic and robotic systems	5	CC/ OC
11	Final certification	8	1	WDDP(P)PCE 401 Writing and defending a thesis (project) or preparing and taking a comprehensive exam	8	FC
TOTAL:		240			240	



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2.1. INTRODUCTION TO MODULAES AND DISCIPLINES

GES-1 GENERAL EDUCATION MODULES							
<i>Module description:</i> The module is presented by a set of general compulsory disciplines that contribute to the development of information literacy in all areas of their life and activities. The disciplines of the module are aimed at forming of ideological, civil and moral positions of the future specialist, competitive on the basis of possession of information and communication technologies, orientation on a healthy lifestyle, self-improvement and professional success. Students get general ideas about the development of philosophy and the impact of the methodology of thinking on the development of science, interpret the content and specific features of the mythological, religious and scientific world view, analyze the main stages of the historical development of Kazakhstan.							
№	Code and name of the discipline	Cycle/ component	Acad. credits	Short description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	GES 101 History of Kazakhstan	GC/ CC	5	The purpose of the discipline is to provide objective knowledge about the main stages of the development of the history of Kazakhstan from ancient times to the present. As a result, students will be able to: demonstrate knowledge and understanding of the main stages of the development of the history of Kazakhstan; correlate the phenomena and events of the historical past with the general paradigm of the world-historical development of human society through critical analysis; possess the skills of analytical and axiological analysis in the study of historical processes and phenomena of modern Kazakhstan; be able to objectively and comprehensively comprehend the immanent features of the modern Kazakh model of development; systematize and give a critical assessment of historical phenomena and processes of the history of Kazakhstan.	the Case study method; brainstorming; Fishbone methods; guest lectures; teamwork; the mental map method	LO 2	essay, presentation, oral exam
2	GES 102 Philosophy	GC/ CC	5	The purpose of the program is to form students' holistic understanding of philosophy as a special form of cognition of the world, its main sections, problems and	Role-playing games; business games; project	LO 2; LO 3	Test; Essay discussion



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				methods of their study in the context of future professional activity and to describe the main content of ontology and metaphysics in the context of the historical development of philosophy;	development; trainings; brainstorming		
3	GES 103 Social and Political Knowledge Module (Sociology, Cultural Studies, Political Science, Psychology)	GC/ CC	8	The purpose of the program is to form the socio-humanitarian worldview of students in the context of solving the problems of modernization of public consciousness	Cases; Presentation; questions and answers; group exercises; Interactive methods	LO 1; LO 2; LO 3	Test; case analysis; presentation defense, discussion of the article; Reports
4	GES 1(2)04 Physical culture	GC/ CC	8	The purpose of the program is to develop physical fitness, mobility of students, the development of teamwork skills through various sports, improving motivation for active and healthy lifestyle.	demonstrative method; practical approach method; training	LO 1; LO 2	control tests, differentiated credit
5	GES 205 Information and communication technology	GC/ CC	5	The purpose of the program is to develop the ability to critically evaluate and analyze processes, methods of searching, storing and processing information, ways of collecting and transmitting information through digital technologies.	Problem-based learning method; discussion; project method; case study	LO 1; LO 2; LO 3	Test, Project
6	GES 106 Fundamentals of Legal Literacy and Anti-Corruption culture	GC/ OC	5	The course is aimed at the formation of a legally competent, law-abiding person who knows his rights and duties, intolerant of any manifestations of corruption. Students will be able to operate with the social, legal and ethical norms of Kazakhstan society.	the Case study method; brainstorming; Fishbone methods; guest lectures	LO 1; LO 2; LO 3	Essays; presentations; written exam



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	<p>GES 106 Fundamentals of Ecology and Safe life</p>		<p>The discipline forms students' modern environmental education and culture, develops skills in the application of methods to increase the safety of technical means and technological processes for safe living. It reveals the basic laws of functioning of ecosystems at various levels of organization, the biosphere as a whole, contradictions arising in the relationship between man and nature, as well as the need for careful attitude to nature and ecology.</p>	<p>Case, fishbone, Table T, "JIK SO" method, "Venn Diagram" method, " Cluster" method Fishbone methods; guest lectures</p>	<p>LO 1; LO 2; LO 3</p>	<p>Oral interview. Essay. Exam (written, test)</p>
	<p>GES 106 Fundamentals of Economics and Entrepreneurship</p>		<p>The discipline is focused on the formation of students' skills of entrepreneurship and business thinking. Through the complex representation of the laws of functioning of the economy, the conditions of carrying out entrepreneurial activity, its internal and external environment, students will be formed skills of developing a business plan, creating and successfully conducting their own business.</p>	<p>the Case study method; brainstorming; Fishbone methods; guest lectures; project method</p>	<p>LO 1; LO 2; LO 3</p>	<p>Essays, presentations, projects, test</p>
	<p>GES 106 Fundamentals of Leadership and receptivity to innovation</p>		<p>The course promotes the disclosure and development of leadership qualities in the personality of each student, the development of skills of innovation receptivity, as a process of adaptation to innovations caused by innovation processes, as well as the use in his life and professional activities of the results of scientific and technical processes and studies the current state and prospects of development of leadership qualities and human factor in management.</p>	<p>Inverted learning, situational learning (case collection), technological learning (padlet board, canvas application, comics, kakhot, etc.)</p>	<p>LO 1; LO 2; LO 3</p>	<p>Orally (solving cases)</p>
	<p>GES 106 Emotional Intellect</p>		<p>The discipline is aimed at the development of the role of tutor by the teacher in the context of strategic guidelines and priorities of the state educational policy</p>	<p>role-playing games; educational</p>	<p>LO 1; LO 2; LO 3</p>	<p>Criteria-based assessment method; Project protection</p>



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				of Kazakhstan. Students determine the place of emotional intelligence and «flexible competencies» in the educational process of modern school. They use modern methods and technologies for organizing educational activities, taking into account the development of flexible skills, including in the digital environment. Students possess methods for assessing and developing emotional intelligence of students of different age groups.	discussions; case study; project method		
	GES 104 Fundamentals of mathematical statistics			The purpose of the discipline is to familiarize students with the forms and laws of consistent thinking, to teach students to think consistently, to contribute to the development of skills of sound argumentation; Students understand the process of data collection, data processing and the transmission of ideas, the skills of using quantitative and qualitative data analysis in assessing the state of the object or phenomenon under consideration are formed.	Explanation; Case study; Group and pair work.	LO 1; LO 2; LO 3	A written exam.

GLC-2 Language communication

Module description: As part of the module, students develop the ability to interpersonal social and professional communication in Kazakh, Russian and foreign languages. Students develop practical skills of oral communication in a non-native language, writing and academic writing.

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	GLC 101 Kazakh (Russian) language	GC/ CC	10	The discipline is aimed at continuing the development of language training in the Kazakh (Russian) language. The purpose of the discipline is a confident command of the language, the ability to use it for professional and educational	ICT technologies; technology of problem-search learning;	LO 1; LO 2; LO 3	Test



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				purposes. Students develop the skills of competent and effective communication in the language, expand their vocabulary, improve grammar and spelling literacy, academic writing skills.	test technologies		
2	GLC 102 Foreign Language	GC/ CC	10	The purpose of the discipline is to expand and consolidate students' communication skills in a foreign language for various purposes. During the study of the discipline, students train and improve the skills of listening to foreign speech, speaking, writing and grammar, enriching personal and professional potential. In the process of studying the discipline, students expand their cultural horizons, develop cross-cultural communication skills.	Communicative; ICT technologies	LO 1; LO 2; LO 3	Test
3	GLC 203 English for Academic Purposes	CC/ UC	5	The discipline forms knowledge of genre varieties of scientific style, mastering modern methods of collecting, storing and processing information and materials in the field of professional activity, as well as the development of skills and skills of academic communication in four types of speech activities: reading, speaking, writing, listening	RWCT strategies, Content analysis technologies	LO 1; LO 2; LO 3	Essay

GER – 3 Global ethics and research

Module description: Module disciplines are aimed at the formation of global competences applicable in professional activities. Students accept the value of building a global inclusive society and contribute to building and supporting it. Students are introduced to scientific research in the professional field, the main methods of data collection and analysis, professional ethics and professional research. Students identify and associate themselves with a representative of the professional field and plan their professional development, motivated by lifelong learning to build competence and increase value in the labour market.



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№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	GER 201 Inclusive education	CC/ UC	6	Problem-Based Learning, Flipped Learning, reflexive learning, interactive learning, problem lecture, business game, solving pedagogical situations, group and individual project, presentation, abstract	Problem-Based Learning, Flipped Learning, reflexive learning, interactive	LO 1; LO 2; LO 3	Oral written and exam, individual and group presentation, individual and group project, quiz
2	GER 402/2 Fundamentals of scientific research	CC/ UC	10	The discipline is aimed at developing research skills in the sphere of professional interests of the future specialist. Students know the basic qualitative and quantitative methods of research, analyze the scientific literature, are able to design and implement their own small-scale (small-scale) research using the necessary tools. Students are able to process data and process research results for presentation to the public orally and in writing.	Problem-Based Learning, Flipped Learning, reflexive learning, interactive	LO 1; LO 2; LO 3	A written exam.
3	GER 303 Professional ethics and identity	MD/ UC	6	The purpose of the discipline is to acquaint students with attitudes, values, knowledge, beliefs and skills accepted in the professional pedagogical environment. Students develop skills of leadership and proactivity in the context of pedagogical activity or outside, develop adherence to the national and cultural values of Kazakhstan, meet and accept as a value strict observance of professional ethics. Students plan their	Method of discussion; Feedback method; Seminar method; Case study.	LO 1; LO 2; LO 3	Written exam



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				career path, develop skills of introspection and self-management.			
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FSCI - 4 Fundamental Science

The module disciplines are directed towards the study of linear algebra and analytical geometry, mathematical analysis and differential equations, probability theory and mathematical statistics. These disciplines are used to create machine learning algorithms and neural networks. Students will study the structure, properties and relationships between numbers, spaces and structures.

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	FSCI 101 Designing algorithms	CC/ UC	6	This course is the first in the specialization "Introduction to programming in Python", its lessons are distributed to any language that students will teach in the future. This is because programming is essentially about figuring out how to solve a class of problems, and writing an algorithm, a clear set of steps to solve any problem. This course will introduce students to the process of problem solving - which they can use to solve any problem of programming. This course learns how to develop an algorithm that moves towards reading code and understanding how programming concepts relate to algorithms.	Problem – based learning Discussion Partial searching Case Study	LO 6, LO 7	Completing in-class assignments, Written exam
2	FSCI 102/1 Higher Mathematics	CC/ OC	5	In the course, students will master the mathematical apparatus for the main sections of the course of mathematics in high school: mathematical analysis and differential equations, probability theory and mathematical statistics. Forms the ability to apply mathematical methods to solve practical problems	Intensive learning Explanations Case-study Reflection Method	LO 6, LO 9	Completing in-class assignments, Written exam



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				with the help of computer mathematics systems, as well as the ability to apply probabilistic and statistical methods to the evaluation of the accuracy of measurements and tests.			
3	FSCI 102/2 Linear Algebra and Analytical Geometry	CC/ OC	5	The goal of this course is to develop mathematical intuition, education of mathematical culture, mastering the logical foundations of the course. As a result of studying the discipline, the student must know the basics of linear algebra and analytical geometry; be able to apply methods of linear algebra and analytical geometry to solve practical problems; to possess methods of linear algebra and analytical geometry.	Explanations Discussion Case-study Reflection Method Explanations Discussion Case-study Reflection Method	LO 6, LO 9	Completing in-class assignments, Written exam
4	FSCI 203/1 Discrete Mathematics and Mathematical Logic	CC/ OC	6	This course is aimed at forming the students' idea of modern algebra as the main theoretical foundation of discrete mathematics; to form an idea about mathematical concepts and methods, which allow you to simulate discrete phenomena and discrete processes of the surrounding world; to form an idea of setting problems in the field of discrete mathematics and skills of description of discrete objects in applied problems.	Explanations Discussion Case-study Reflection Method	LO 6, LO 9	Completing in-class assignments, Written exam
5	FSCI 203/2 Probability Theory and Mathematical Statistics	CC/ OC	6	This course is aimed at the formation of basic knowledge and basic skills in the theory of probabilities necessary for solving problems arising in the mathematical support of applied activities; the formation of students' theoretical and probabilistic apparatus, necessary for solving theoretical and applied problems; formation of conceptual theoretical and probabilistic base and level of algebraic preparation necessary for understanding the bases of mathematical statistics and its application.	Explanations Discussion Case-study Reflection Method	LO 6, LO 9	Completing in-class assignments, Written exam



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6	FSCI 204 Information Technology Hardware	CC/ UC	6	The course covers computer architecture types, internal and external computer devices, processor and storage devices. During the course, students will be introduced to the functions and tools of the operating system for computer hardware management. They will also acquire practical skills of working with system service programs. Students will learn how to build a computer and install a motherboard, install and uninstall an operating system, connect cables, distribute memory, etc.	Intensive learning Problem- based learning Round table discussion Association method Research method	LO 6, LO 8	Completing in-class assignments, Written exam
7	TP 105 Training practice	CC/ UC	2	Students need to prepare for the conscious and in-depth study of basic disciplines and acquire the skills of independent practical work to solve mathematical problems.	Intensive learning Role – playing games	LO 6	Case measurements, portfolio

PLT-5 Programming and learning technologies

The module «Languages and Programming Technologies» includes a course on programming disciplines that form the basic knowledge on programming methods and technologies. The module is aimed at studying the basic principles of programming, debugging of programs, general information about object-oriented programming, development of Web-applications, communication with databases. Students will be introduced to the basic concepts of programming: data types, algorithms, methods of recording algorithms, structure, operators and constructions used in various programming languages (Python, C++, Java).

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	PLT 201 Object-oriented programming	CC/ UC	6	In this course, all the concepts of object-oriented programming are studied using simple examples. They will learn how to work object-oriented programming using Python. In the course, students will learn how to work in a team, create stable and extensible	Project method Problem- based learning Partial searching Case-study	LO 9, LO 7	Completing in –class assignments. Project work



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				applications, learn not only the basics of object-oriented programming, but the principle of its operation at a deep level. The course considers the relationship of classes and instances in computer memory, students will learn to redefine the behavior of classes and basic operators, understand polymorphism, inheritance, encapsulation on simple examples, consider the principle of dynamic editing classes, consider the main concepts of metaprogramming, learn to optimize classes and use class decorators, consider advanced topics for working with polymorphism and data classes. After completing the course, students will be able to apply their new knowledge in their design work.			
2	PLT 302 Programming language JAVA	CC/ UC	6	The course covers the Java programming language, features of object-oriented programming in the Java language; exception handling, file I/O input/output using the basic I/O, as well as multi-threaded programming. The course includes questions of building Java applications, including the basics of functional programming introduced in the version of Java 8.	Project methods Problem – based learning Research method	LO 9, LO 7, LO 9	Completing in –class assignments. Project work
3	PLT 403 Parallel Programming	MD/ UC	5	This course is aimed at theoretical and practical training of students in the field of software development for high-performance parallel computer systems, configuration and administration of such systems to such an extent, so that they can choose the necessary technical, algorithmic, software and technological solutions, be able to explain the principles of their operation and use them correctly.	Project methods Problem – based learning Discussion Partial – research Case - study	LO 9, LO 7, LO 9	Completing in –class assignments. Project work



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4	PLT 304/1 Web Application Programming	CC/ OC	5	The course includes basic knowledge of web programming, including CSS, plug-ins, scripts, basic data access and application hosting. This course will teach students how to work with HTML5, CSS, JavaScript programming language and the popular jQuery framework. As a result, students will prepare their individual digital projects - a full-fledged hosting site and a web application with adaptive typesetting.	Explanations Discussion Case – study Reflection methods	LO 5, LO 6	Completing in –class assignments. Project work
5	PLT 304/2 Methods for Developing Web Applications	CC/ OC	5	The course allows to study methods of architecture design and integration. Learning from the basics, what is the Internet and why it is needed, and then gradually turns to complex topics. In the course students will get acquainted with the principles of building the architecture of web services, the diversity of integration through the API and through message brokers. Students will learn a wide range of concepts of integration design with the help of APIs and messaging brokers, about which you need to know.	Explanations Discussion Case – study Reflection methods	LO 5, LO 6	Completing in –class assignments. Written exam
6	PLT 205 Databases	CC/ UC	5	The basis of the course is the study and application of the SQL language for the creation, modification of database objects and data management in an arbitrary relational database. Implementation of practical tasks within the framework of the course involves the use of My SQL database. The course covers the stages of designing relational databases, rules of query compilation, and basic methods of indexing data. The course will explore the use of transactions and data access rights. The course also provides an overview of current trends in data science due to the advent of BigData. The conclusion of the course will show the applications of NoSQL databases and indicate modern approaches to processing big data.	Project method Problem learning method Discussion Partial searching Case-study	LO 9, LO 7, LO 9	Completing in –class assignments. Project work



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7	TP 206 Training practice	CC/ UC	2	The practice is focused on the development of practical skills in programming linear, branched, cyclic algorithms, one-dimensional/two-dimensional arrays and for solving specific mathematical problems is the consolidation and deepening of theoretical knowledge in the field of programming.	Intensive learning Role- playing games Reflection method	LO 6, LO 7	Case measurements, projects, portfolio
8	PP 307 Production practice	CC/ UC	4	Formation of practical skills required in professional work, development of software complexes, educational sites testing applications. Formation of students independent creative approach to performing functions.	Intensive learning Role- playing games Reflection method	LO 6, LO 9	Case measurements, projects, portfolio

DAET-6 Digital Analytic Education Technology

This course covers advanced computer game development environments, mobile application design, machine learning techniques and IT project creation and management. The module consists of courses that provide a solid theoretical understanding and significant practice for educational analysis and management.

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	DAET 301/1 Designing Mobile Applications	MD/ OC	5	This course will introduce you to Android Studio and the fundamental concepts of application development for Android. Become familiar with high-level programming and master the tools needed to develop applications for Android. Learn about operating systems and various platforms for creating mobile applications. In the end will develop an application for Android with the construction of each aspect of the managed project.	Educational discussion Illustration method Laboratory Problem – based learning Portfolio method	LO 9, LO 5	Completing in –class assignments. Project work
2	DAET 301/2 Development and Creation of Computer Games	MD/ OC	5	This course deals with advanced game development environments for PC, mobile devices (Android, iOS) and browsers. Students are introduced to the Unity3D engine and MonoDevelop game scripting environment, learn how to create a 2D scene, program	Educational discussion Illustration method Laboratory	LO 9, LO 5	Completing in –class assignments. Project work



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				game logic and develop its concept, and self-organize elements, test and debug, finalise the game and add audio support	Problem-based learning Portfolio method		
3	DAET 202/1 Machine Learning	CC/ OC	5	This program consists of courses that provide a thorough theoretical understanding and significant practice of basic algorithms, how to use them and best practices related to machine learning in Python. Will learn to prepare quality data for further processing with the adoption of machine learning methods. Students will study the libraries NumPy, Pandas, Matplotlib, Seaborn, Scikit-Learn and more. Will master the methods of machine learning in practice.	Explanations Demonstration method Case- study Researching	LO 4, LO 8	Completing in –class assignments. Written exam
4	DAET 202/2 Fundamentals of Artificial Intelligence	CC/ OC	5	In this course the main directions of work in the field of artificial intelligence will be introduced. On this course will understand the importance of quality data. Study general methods of data extraction, data cleaning, functional engineering applications and prepare them for preliminary analysis and hypothesis testing.	Explanations Demonstration method Case- study Researching	LO 4, LO 9	Completing in –class assignments. Written exam
5	DAET 403 IT Project Management	MD/ UC	5	The course will provide the necessary skills to play entry-level roles in project management. This course will introduce the underlying terminology of project management and provide a better understanding of the role and responsibilities of the project manager. Students also get to know the kinds of jobs they can design. Throughout the program, they will receive multidisciplinary educational experience that will help to develop skills for application in the workplace. By the end of this course will be able to define project management and understand what the project is, study roles and responsibilities in the field of project management in various industries, describe in detail	Project method Problem-based learning Discussion Partial searching Case study	LO 8, LO 9	Completing in –class assignments. Project work



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				the basic skills that help the project manager to succeed, describe the life cycle of the project and the importance of each stage, compare different methodologies and approaches to programme management and determine which of them is most effective, determine the organizational structure and culture and how it affects project management, define change management and the role of the project manager in this process.			
6	DAET 304/1 Design of Information Systems	MD/ OC	5	This course provides the basic concepts of information systems design technology. Teach the processes and models of the life cycle of information systems. They will study organizations designing information systems. At the end of the course, they will learn skills in designing information systems.	Explanation Demonstration method Research – based learning	LO 4, LO 7, LO 8	Completing in –class assignments. Written exam
7	DAET 304/2 Analytical Software	MD/ OC	5	In this course students will gain knowledge in the application of methods of analytical processing of super-large volumes of information stored in modern data warehouses, improving the skills of practical use of methods of mathematical statistics and machine learning for solving data processing problems, as well as improving the skills of using analytical software, designed for the mining of data, aimed at the formation of a holistic view of the analysis and interpretation of data, both on the search process and the application of hidden patterns in order to achieve the objectives.	Educational discussion Illustration method Problem- based learning Portfolio method	LO 5, LO 7	Completing in –class assignments. Written exam

ITES-7 Innovative technologies in the educational system

The module will address the fundamental principles of web analytics, including measuring website attendance and user behaviour. Students also learn about the importance of web analytics in digital marketing and creating effective online interaction. The module will introduce students to the digital transformation of the education system and the use of technology in teaching and learning. This includes understanding different types of educational technologies. The module will also cover the information and analytical systems used in education, including data warehouses, decision support systems. Students learn about the use of these systems for data analysis, reporting and decision-making in education.



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In general, this module gives students a comprehensive view of web analytics, digital transformation of the education system, information and analytical systems and intellectual analysis of educational data.

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	ITES 301/1 Web Analytics	MD/ OC	6	This course is aimed at studying web systems in the educational system. In this course students will get acquainted with educational sites (kundelik, bilimlend, darynonline, etc.), will study the structure of educational sites and master the methodology of web-analysis, analysis of site attendance, will analyze usability, scrolling, behavior of visitors on the page. At the end of the course, they will be able to compare with general trends and with competitors using independent platforms.	Educational discussion Illustration method Problem- based learning Portfolio method	LO 5, LO 6	Completing in –class assignments. Written exam
2	ITES 301/2 Digital Transformation of the Education System	MD/ OC	6	The course is aimed at solving the problems of socio-economic development of the country in the context of the fourth industrial revolution and the establishment of the digital economy. The experience of digitalizing education worldwide is being studied.	Case study Problem – based learning Discussion Heuristic study	LO 9, LO 8	Completing in –class assignments. Written exam
3	ITES 302 Information and Analytical Systems	MD/ UC	5	This course is aimed at acquainting students with the principles of construction and operation of analytical information systems, mastering the basics of data analysis and acquiring practical skills in the application of modern analytical information systems (Power BI, Excel) design of the system of data loading into information stores, processing of requests and presentation of analysis results.	Partial searching Research Illustration method Cognitive problem presentation	LO 4, LO 6, LO 7	Completing in –class assignments. Written exam



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4	ITES 303 Educational Data Mining	CC/ UC	5	This course is aimed at studying methods of data mining that can solve real problems, as well as studying methods of analysis of educational data and their characteristics, as well as studying the main areas of data analysis and their advantages, as well as ways to use different data learning algorithms.	Problem-based learning Discussion Partial searching Case study	LO 8, LO 9	Completing in –class assignments. Written exam
5	P(P)P 404 Pre-diploma (Production) practice	MD/ UC	2	Practice forms students' skills to independently analyze the available information, identify fundamental problems, search for sources of literature with the involvement of modern information technologies; conduct statistical processing of experimental data, analyze the results and professionally document, present and report the results of research	Mutual learning method Problem – based exposition Reproductive method of teaching	LO 7, LO 8, LO 9	Criteria assessment Monitoring map

ISDMS-8 Information security and database management system

The module will address fundamental principles of cybersecurity, including threat modelling, risk assessment and security architecture. This module gives students a comprehensive understanding of cybersecurity, including attack vectors, client-server technology, and big data analytics. The module is designed to provide students with the knowledge and skills needed to develop and implement effective cybersecurity solutions.

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	ISDMS 301 Cyber Security and Attack Vectors	MD/ UC	6	This course provides the knowledge needed to understand the fundamentals of cybersecurity. Students learn the history of cybersecurity, the types and motivations of cyberattacks, to deepen their knowledge of current threats to organizations and individuals. Key terminology, basic systems concepts and tools will be considered as an introduction to cybersecurity. Students learn about critical thinking and its importance. Acquire knowledge about	Problem-based learning Discussion Partial searching Case study	LO 9, LO 4	Completing in –class assignments. Written exam



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				organizations and resources for further research on cybersecurity in the modern era.			
2	ISDMS 202/1 Client-server technology	CC/ OC	6	The course is aimed at studying the technology "Client-server", the principle of distributed database, the positive and negative sides of the architecture "Client-server", are introduced to distributed database models; examples of client-server application developmentserver with SQL; learning transactions and locks.	Problem-based learning Discussion Partial searching Case study	LO 9, LO 4	Completing in –class assignments. Written exam
3	ISDMS 202/2 Big Data	CC/ OC	6	Discipline examines in-depth insights into big data technologies, their features and prospects in practice. The course consists of interconnected blocks, which will present both technological and economic features of the use of big data technologies, options for building the necessary infrastructure for specific use. The practical application of big data technologies using different tools.	Problem-based learning Research Project method	LO 4, LO 8	Completing in –class assignments. Written exam
4	PP 403 Production practice	MD/ UC	16	The practice is aimed at acquiring experience of professional activity and independent work in the field of design, development, modification of information systems, collection, analysis and synthesis of materials for the preparation of materials of the report on practice and diploma projects.	Reproductive method of teaching Researching	LO 7, LO 8	Criteria assessment Monitoring map

CNM-9 Computer networks and modelling

This module provides insight into computer networks and their design, as well as the use of modelling and design in education and analysis. The disciplines of the module cover such areas as network architecture, communication protocols, cloud technologies, mathematical and computer modeling and network security. Overall, this module provides a comprehensive overview of computer networks and modelling and prepares students for a career in network design, analysis and education.

№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
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1	CNM 301/1 Computer network design	CC/ OC	5	The course covers the basic concepts and definitions of computer networks: components, network topology, network functions, protocols, stacks, OSI protocol set, network architecture. Technologies of network design and their hardware. During the course, students will master the skills of creating a local computer network, learn to apply in practice the general principles of networking, perform network diagnostics.	Explanation Demonstration method Case Study Research	LO 5, LO 8	Completing in –class assignments. Written exam
2	CNM 301/2 Computer Networks and Cloud Technologies	CC/ OC	5	This course will teach the principles of operation and construction of computer networks and applications of cloud technologies in solving professional problems. Will master the purpose of protocols and technology of data transfer in networks and cloud technology.	Problem-based learning Discussion Partial searching Case study	LO 5, LO 8	Completing in –class assignments. Written exam
3	CNM 202/1 Modeling and design in education	CC/ OC	5	The course covers the basics of polygonal 3D modeling, technologies, types and methods. Students will get to know the world of 3D technologies and learn basic practical skills at AutodeskMaya.	Problem-based learning Project learning method Intensive, Association Method Discussion Research	LO 7, LO 9	Completing in –class assignments. Written exam
4	CNM 202/2 Mathematical and Computer Modeling	CC/ OC	5	The course forms at students the basic concepts on modeling, by types and classifications of models, the ability to represent the model in mathematical and algorithmic form, i.e. with methods of formalization of objects, processes, phenomena and their implementation on the computer. And students will learn to solve mathematical problems, build graphs, etc. with the help of the computer system Maple, apply various models and algorithms of model construction.	Problem-based learning Discussion Partial searching Case study	LO 6, LO 9	Completing in –class assignments. Written exam



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				Moreover, students will acquire the skills of building simulation models of information processes.			
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№	Code and name of the discipline	Cycle/ Component	Acad. credits	Description of discipline	Teaching methods	Learning Outcome Generator	Evaluation methods
1	WDDP(P)PCE 401 Writing and defending a thesis (project) or preparing and taking a comprehensive exam	IIA	8	The practice is aimed at acquiring experience of professional activity and independent work in the field of design, development, modification of information systems, collection, analysis and synthesis of materials for the preparation of materials of the report on practice and diploma projects.	Mutual learning method Problem – based exposition Reproductive method of teaching	LO 7, LO 8, LO 9	Criteria assessment Monitoring map



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