ХАЛЫҚАРАЛЫҚ УНИВЕРСИТЕТІ МЕЖДУНАРОДНЫЙ УНИВЕРСИТЕТ
INTERNATIONAL UNIVERSITY

Faculty of Information Technology
Department of "Information Systems"

APPROVED BY
Vice-rector for academic affairs,
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"___" _____20__ .

6B01501
(Code of Academic Program)

"Computer science and organization of digitalization of education"
(Name of Academic Program)

CATALOGUE OF ELECTIVE DISCIPLINES

2020

2020

05/10/2020

The catalogue of elective disciplines for the specialty/AP _____

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_ is developed on the basis of the working curriculum of the specialty/AP.

The catalogue of elective disciplines was discussed at a meeting of the department

_____

minutes No. 9 from "09" 04 2020.

Head of Department _____ Serbin V.V., c.t.s., assoc.prof.
signature Full name, position, degree

CED compiler _____ Seitkulov Zh.
signature Full name, position, degree

The catalogue of elective disciplines was approved at a meeting of the Academic Council of "International Information Technology University" JSC minutes No. 5 from "14" 04 2020.

Director of Academic Affairs _____ Mustafina A.K.
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1 TERMS AND ABBREVIATIONS

1. 1 Academic program is a single set of basic characteristics of education, including goals, results and content of training, the organization of educational process, ways and methods for their implementation and criteria for assessing learning outcomes.

The content of academic program of higher education consists of three cycles of disciplines - general education disciplines (hereinafter - GED), basic disciplines (hereinafter - BD) and core disciplines (hereinafter - CD).

The cycle of GED includes disciplines of the compulsory component (hereinafter - CC), the university component (hereinafter - UC) and (or) the component of choice (hereinafter - COC). BD and CD include disciplines of UC and COC.

1. 2 Catalogue of elective disciplines (CED) is a systematic annotated list of all COC disciplines, for the entire training period, containing a brief description indicating the purpose of study, a summary of main sections and expected learning outcomes. CED reflects the prerequisites and postrequisites of each academic discipline. It should provide the students with the possibility of an alternative choice of elective disciplines for the formation of an individual educational trajectory.

On the basis of academic program and CED, the students develop individual curricula with the help of advisers.

1. 3 Individual curriculum (IC) is a curriculum formed by the students independently with the help of an adviser for each academic year on the basis of the academic program, the catalogue of elective disciplines or modules;

IC defines an individual educational trajectory of each student separately. It includes disciplines and types of educational activities (internship, experimental research, forms of final certification) of the compulsory component (CC), the university component (UC) and the component of choice (COC).

1. 4 Advisor is a teacher who performs the functions of an academic mentor of a student (according to the appropriate academic program), and assists in choosing a learning path (creating an individual curriculum) and mastering the academic program during the training period.

1. 5 The university component is a list of compulsory educational disciplines determined by the university independently for the mastering of the academic program.

1. 6 The component of choice is a list of academic disciplines and the corresponding minimum amounts of academic credits offered by the university and independently chosen by students in any academic period, taking into account their prerequisites and postrequisites.

1. 7 Elective disciplines are educational disciplines that are a part of the university component and the component of choice in the framework of established academic credits, introduced by organizations of education reflecting the individual preparation of students and taking into account the specifics of socio-economic development, the needs of a particular region and established scientific schools.

1. 8 Postrequisites are the disciplines and (or) modules and other types of academic work, the study of which requires knowledge, skills and competencies acquired at the end of the study of this discipline and (or) modules;

1. 9 Prerequisites are the disciplines and (or) modules and other types of educational work containing knowledge, abilities, skills and competencies necessary for the mastering of the studied discipline and (or) modules;

1. 10 Competencies are the ability of the practical use of acquired knowledge and skills in professional activities.

2 ELECTIVE DISCIPLINES

№	Cycle of discipline	Code of discipline	Name of discipline	Semester	Number of credits	Prerequisites
			1 year			
	Major disciplines	OST 1303	Educational smart technologies	2	5	Information and communication technologies
			2 year			
	Basic disciplines (BD)	TMV 2226	Theory and methodology of educational work	3	5	No
	Basic disciplines (BD)	WBT 2221	WEB design	4	5	Information and communication technologies
	Basic disciplines (BD)	PAI 2222	Legal aspects of intellectual property	4	5	Information and communication technologies
			3 year			
	Basic disciplines (BD)	OMR 3215	Fundamentals of Mechatronics and Robotics	5	5	Physics
	Basic disciplines (BD)	KSC 3218	Computer networks	5	5	Physics
	Basic disciplines (BD)	IBZI 2220	Information security and information protection	5	5	Algorithmization and Programming Languages
	Basic disciplines (BD)	IO 3214	Inclusive education	6	5	Pedagogy
	Basic disciplines (BD)	MPI 3216	Teaching methodology of informatics	6	5	Theoretical foundations of computer science
	Basic disciplines (BD)	ACS 3219	Computer systems architecture	6	4	Physics
	Major disciplines	OP 2304	Olympiad programming	5	5	Programming 1
	Major disciplines	MO 3306	Management in education	6	6	Pedagogy
	Major disciplines	ZTO 3308	Digital technologies in education	6	6	Information and communication technologies
			4 year			
	Basic disciplines (BD)	OII 4217	Artificial Intelligence Fundamentals	7	5	Programming 3
	Basic disciplines (BD)	KVA 4225	Computer video editing and animation	7	5	Information and communication technologies
	Basic disciplines (BD)	DO 3224	Distance learning at school	7	5	Pedagogy, Information and Communication Technologies
	Major disciplines	TMO 3305	Mobile learning technologies and augmented reality	7	5	Pedagogy
	Major disciplines	ITO 3307	Innovative technologies in the organization of the educational process at school	7	4	Pedagogy

	Major disciplines	ZRO 4310	Digital resources in education	7	5	Innovative technologies in the organization of the educational process at school
	Major disciplines	OND 4309	Fundamentals of scientific activity in the school computer science course	7	5	No

3 DESCRIPTION OF ELECTIVE DISCIPLINES

Description of discipline	
Code of discipline	OST 1303
Name of discipline	Educational smart technologies
Number of credits (ESTS)	5
Course, semester	2
Department	IS
Course author(s)	Sharipov B. Zh.
Prerequisites	Information and communication technologies
Postrequisites	Teaching methodology of informatics
The aim of study of a discipline	The course includes the formation of the necessary competencies in students in the field of new information, communication and interactive technologies, in the formation of the skills of creating their own interactive programs for visualizing educational material and improving the quality of teaching.
Brief course description (main sections)	The course includes the formation of the necessary competencies in students in the field of new information, communication and interactive technologies, in the formation of the skills of creating their own interactive programs for visualizing educational material and improving the quality of teaching. Studying the features and main directions of using ICT as a means of teaching and managing the learning process at the teacher's level, as well as the practical development of the methodology for organizing the educational activities of school students on the basis of ICT. SMART interactive technologies in education.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know • the procedure for using ICT in the educational process of the school, their role, place and conditions for effective use; • classification of ICT teaching aids; the procedure for the creation and use of pedagogical software and technologies focused on the formation of the student's skills to carry out various types of independent activities for the collection, processing, storage, transmission, production of educational information; • requirements for electronic teaching materials; sanitary and hygienic standards that must be observed when organizing and conducting training sessions using ICT; • the procedure for the functioning of open educational systems of telecommunication access based on the potential of a distributed information resource and, first of all, the Internet; • the procedure and features of the use of ICT tools in managing the educational process at the teacher's level; • the procedure for creating and using ICT-based monitoring tools for students' learning activities; methods of processing and analysis of monitoring results; • methods of using ICT as a teaching tool in mastering a specific academic discipline; • Smart-education: a new approach to the development of education;

	• know the basics of Smart-learning: the basic principles of organizing the educational process; • ways of forming an electronic university. The concept of SMART University. Be able to • work with basic software; • prepare content (content) in their academic discipline for open systems for educational purposes; • use ICT in carrying out various types of classes, in various types of educational activities; • use ICT in the teacher's professional activity. • apply "cloud technologies" in the educational process. Be competent • ready to work in global networks; • able to understand the meaning of information; • ready to process information in various forms of presentation (text, numerical, graphic (static and dynamic), sound, video) using software systems; • own the technical and technological foundations of computer systems, local and global networks; ready to work with new software.

Description of discipline	
Code of discipline	TMV 2226
Name of discipline	Theory and methodology of educational work
Number of credits (ESTS)	5
Course, semester	3
Department	IS
Course author(s)	Saudabayeva G.S.
Prerequisites	No
Postrequisites	Teaching methodology of computer science
The aim of study of a discipline	Formation of professional and pedagogical competence of future teachers in the knowledge of the foundations of the education process, the technology of organizing and implementing educational activities.
Brief course description (main sections)	The course develops students' attitudes towards mastering professional and pedagogical competencies in the field of theory, methodology and technology of educational work with students. Expands and deepens knowledge on the theory of education. Forms general pedagogical and special competencies in students.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: • theory of education and educational work; • about the system and directions of the class teacher's activity; • about the forms, methods, means and techniques of educational work; • about the technology of educational work and collective creative work (KTD); • on the diagnosis of the level of education of schoolchildren. Be able to: • planning educational work in the classroom; • forming a children's team and diagnosing its condition; • organization of KTD and the use of innovative education technologies; • diagnostics and work with difficult children; • interaction with parents and organizations of additional education; • work with gifted children; • vocational guidance work at school. Be Competent: • the ability to independently master and use new educational technologies, to master new areas of educational activity;

	• the ability to form resource and information bases for the implementation of practical activities and taking into account the specific characteristics of the pupil; • the ability to apply modern methods and technologies of organizing educational activities, diagnostics and assessment of the quality of education and socialization of individuals; • the ability to manage the educational team; • the ability to apply the forms and methods of education in educational institutions.

Description of discipline	
Code of discipline	WBT 2221
Name of discipline	WEB design
Number of credits (ESTS)	5
Course, semester	4
Department	IS
Course author(s)	Umarov F.
Prerequisites	Information and communication technologies
Postrequisites	Graduation project
The aim of study of a discipline	Teach students the technology of Web design. As a result of studying the discipline, the student must have an idea (understand and be able to explain) the basic concepts and principles of Web design
Brief course description (main sections)	The course continues web development using PHP, JavaScript and other web technologies while programming web information systems. The course introduces best practices in web design. Topics include customer expectations, advanced markup language, multimedia technology, usability and accessibility, and methods for evaluating web design.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: the basics of web design, the basics of website design and design technology. Be able to: design your websites using website design technologies. Able to apply basic information processing algorithms to solving applied problems, evaluate the complexity of algorithms, program and test programs

Description of discipline	
Code of discipline	PAI 2222
Name of discipline	Legal aspects of intellectual property
Number of credits (ESTS)	5
Course, semester	4
Department	IS
Course author(s)	Serbin V.V.
Prerequisites	Information and communication technologies
Postrequisites	Graduation project
The aim of study of a discipline	Analysis of the current state and prospects
Brief course description (main sections)	development of legislation on intellectual property and the formation of students' skills of the correct application of legal norms to various situations on the settlement of relations on intellectual property issues.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	- Acquisition of knowledge about the specifics of legislation, regulating relations in the field of intellectual property, the ability to interpret them; - To acquire the skills of resolving specific disputable situations on the use and protection of rights to intellectual property property; - Acquire skills in research work, analysis the practice of applying the legislation governing relations in

	the field of intellectual property, formation and justification of proposals for its improvement; - Provide information in the form of presentations, essays, abstracts; - Needs for personal development and professional growth.

Description of discipline	
Code of discipline	OMR 3215
Name of discipline	Fundamentals of Mechatronics and Robotics
Number of credits (ESTS)	5
Course, semester	5
Department	IS
Course author(s)	Karimzhan N.
Prerequisites	Physics
Postrequisites	Graduation project
The aim of study of a discipline	Acquaintance with the basic concepts of mechatronics and robotics, mastering the principles of design, construction and control of robotic systems, the formation of modern ideas and skills in the field of integrated automation of production processes for various purposes using modern flexible automation tools - mechatronic devices and industrial robots.
Brief course description (main sections)	More and more sophisticated automated and robotic work lines come into modern production, which can only be controlled by a well-educated specialist. The use of robotic platforms and digital laboratories in the module increases the motivation of students to study, using knowledge from almost all academic disciplines. At the same time, interdisciplinary studies are based on a natural interest in the development and construction of various mechanisms.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Understand the characteristics and components of mechatronic systems. Know the latest trends in mechatronics. Describe active and passive electrical circuits. Describe the methods used to develop a mechatronic process. Be able to suggest possible design solutions.

Description of discipline	
Code of discipline	KSC 3218
Name of discipline	Computer networks
Number of credits (ESTS)	5
Course, semester	5
Department	Information systems
Course author(s)	Kassymova A.B.
Prerequisites	Physics
Postrequisites	Dictributed computing
The aim of study of a discipline	This course provides students with a working vocabulary, as well as the knowledge and skills required to implement, debug and enhance basic networked applications. The course also provides students with insights about the kinds of defects that can be exploited to the system's detriment; how these attacks are carried out; and how they can be prevented, detected and stopped.
Brief course description (main sections)	This course explores networked communication from local area networks (LAN) up to the global Internet. The standard problems and a range of solutions for each are explored, with a special focus on the TCP/IP protocol suite. Students will be able to identify the benefits of

	networked communication, the protocols used, the problems that arise, the standard solutions and their advantages and disadvantages.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	• Produce simple client-server and peer-to-peer applications. • Use standard protocols to address various communications issues. • Develop proper software configurations to establish a secure and functioning networked application. • Use standard hardware and software tools to manage a network for a distributed application. • Apply performance analysis tools to assess network performance. • Employ standard networking diagnostic tools to debug standard network problems.

Description of discipline	
Code of discipline	IBZI 2220
Name of discipline	Information security and information protection
Number of credits (ESTS)	5
Course, semester	5
Department	Information and communication technologies
Course author(s)	Mukhitova K.
Prerequisites	Algorithmization and Programming Languages
Postrequisites	Cyber Security
The aim of study of a discipline	To understand the basic security principles and cryptography techniques.
Brief course description (main sections)	The Information Security module is centered round a core Security theme that introduces students to fundamental security topics that arise in the design, analysis, and implementation of networked and distributed systems. Subsidiary themes allow students to investigate broader areas in which they may apply their newly acquired skills. The module is designed for students who wish to specialize in the security aspect of the Computer Science field.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	• solve different encryption/decryption algorithms in order to manipulate data • illustrate appropriate decisions regarding the adoption and implementation of information security related technologies, policies and practices in complex and unpredictable situations • identify network security protocols and protection principles • list security information security risks and ways to cope with them • present data leakage and its impact on the organization

Description of discipline	
Code of discipline	IO 3214
Name of discipline	Inclusive education
Number of credits (ESTS)	5
Course, semester	6
Department	IS
Course author(s)	Khussainova G.
Prerequisites	Pedagogy
Postrequisites	Graduation project
The aim of study of a discipline	This course is designed to address the following goals in regard to teaching in Special Education. There are teaching standards that were developed to facilitate the induction of beginning teachers into their professional roles and responsibilities by providing a common

	language and a new vision of the scope and complexity of teaching. The standards are not set forth as regulations to control the specific actions of teachers, but rather to guide teachers as they define and develop their practice.
Brief course description (main sections)	This course is designed to introduce credential candidates to the knowledge and skills needed to teach special populations, including students who are gifted and talented and students with disabilities, in general education settings.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	• Demonstrate an understanding of relevant governmental legis lation, regulation, and policies that pertain to the development of edu cational programs for students with special needs, including major ca tegories of disabilities. • Discuss the concept of least restrictive alternatives and exami ne the research and rationale(s) for inclusive education. • Demonstrate an understanding of the role and responsibilities of the general educator in the design of Individual Education Progra ms (IEP), including identification, referral, IEP development, and implementation. • Discuss principles of educational assessment for special popu lations, including testing bias, sensitivity to cultural and language fac tors, and the importance of adaptations for English Language Learner s (ELL). • Demonstrate an understanding of the characteristics and effec tive applications of collaboration, including working with families an d paraprofessionals in the design and implementation of assessment a nd instructional programs for students with disabilities. • Analyze classroom and student needs in organizing and plann ing instruction for special populations, including the design of accom modations and the use of assistive technologies. • Demonstrate an understanding of appropriate instructional ma terials and methods for students with low incidence disabilities and t he accommodations that can be made for them in general education c lassroomsDemonstrate an understanding of appropriate instructional materials and methods for students with high incidence disabilities a nd the accommodations that can be made for them in general educati on classrooms. • Describe effective curricular and instructional approaches and accommodations that ensure access to the content areas, including lit eracy, mathematics, science, and social studies. • Demonstrate an understanding of strategies for increasing stu dents' positive behaviors and promoting the social integration of stud ents with special needs in general education classrooms.

Description of discipline	
Code of discipline	MPI 3216
Name of discipline	Teaching methodology of informatics
Number of credits (ESTS)	5
Course, semester	6
Department	IS
Course author(s)	Duysebekova K.S.
Prerequisites	Theoretical foundations of computer science
Postrequisites	Fundamentals of scientific activity in the school computer science course
The aim of study of a discipline	The main goal of the course is the methodological preparation of the future teacher of informatics, who must be ready to teach and educate students, taking into account the specifics of the subject taught; contribute to socialization, the formation of a general culture of the

	individual, a conscious choice and subsequent development of professional educational programs; use a variety of techniques, methods and teaching aids; ensure the level of training of students that meets the requirements of the state educational standard.
Brief course description (main sections)	This discipline is a methodological training of a computer science teacher. The course reflects the current state and prospects for the development of computer science as a science, the practice of its use, the educational material formed on this basis, which constitutes the content of education.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: - Concepts of informatization of education; - Principles of didactics and teaching of computer science; - Information tools for studying computer science; - Sanitary and hygienic standards; - Didactic requirements for a computer; - The technology of creating educational elements for the course of computer science; - Methodology for learning a programming language. Be able to: - Use telecommunications in the school computer science course; - To fulfill the needs of the student's personality in the study of computer science. Have an idea: - On the operating systems of school personal computers; - On the optimization of information resources, technical means of studying computer science.

Description of discipline	
Code of discipline	ACS 3219
Name of discipline	Computer Systems Architecture
Number of credits (ESTS)	4
Course, semester	6
Department	IS
Course author(s)	
Prerequisites	Physics
Postrequisites	Robotics
The aim of study of a discipline	The purpose of the course is to familiarize the students with the basic knowledge of the construction and work of the computer system and with the low-level programming skills and the factors influencing the design of hardware and software elements of computer systems.
Brief course description (main sections)	The course “Architecture of computer systems” presents basic computer hardware element concepts, equipment principles, and computer performance evaluation techniques that are used in computer system design processes. Course also includes the fundamentals of assembly language and programming of microcontroller and its components.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	• understand inner workings and performance capabilities of processors • select an appropriate computer system for given application domains • differentiate the memory types and their operating principles • program microcontrollers using low-level programming languages • be able to read and understand an assembly code

Description of discipline	
Code of discipline	OP 2304

Name of discipline	Olympiad programming
Number of credits (ESTS)	5
Course, semester	5
Department	IS
Course author(s)	Sultanov Ye.
Prerequisites	Programming 1
Postrequisites	None
The aim of study of a discipline	Learning of algorithms, data structures and creating programs to solve practical problems using the language C++.
Brief course description (main sections)	The course "Olympiad programming" is designed for studying of algorithms and programs development to solve different problems. For this purpose, program structure, principles of construction of algorithms and programs, methods of solving, algorithmization, programming, debugging and implementation of programs, using the language C++ are considered.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	1. To list data structures, operators and basic algorithmic construction in C++. 2. To develop block diagrams of various algorithms using general principles of algorithms construction 3. To identify the types of variables for solving the practical tasks. 4. To solve practical tasks by creating programs on C++ in good style. 5. To compare and contrast the different ways of solving a problem after testing the program. 6. To modify and rewrite the created program using the analysis. 7. To explain the constituted program documentation.

Description of discipline	
Code of discipline	MO 3306
Name of discipline	Management in education
Number of credits (ESTS)	6
Course, semester	6
Department	IS
Course author(s)	Alimzhanova L.M.
Prerequisites	Pedagogy
Postrequisites	Fundamentals of scientific activity in the school computer science course
The aim of study of a discipline	assistance in the formation of the basic professional competence of a bachelor in the field of management of educational systems.
Brief course description (main sections)	The course is devoted to the formation of knowledge about the scientific foundations of management in education and management of the development of educational systems; to reveal the essence and characteristics of the main system-forming elements of educational management; to reveal the main problems of management in education;
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	know: - the essence and features of innovative and advanced management experience in education; –Modern ways of generalizing innovative and advanced management experience in education; –Criteria for assessing the effectiveness of innovative and advanced management experience in education. be able to:

	- design ways to assess and summarize innovative and advanced management experience in education; - apply specific methods for assessing and generalizing innovative and advanced management experience in education; - to present the results of the assessment and generalization of innovative and advanced management experience in education; - to exchange innovative experience in the field of management in education. own: - methods of analysis and critical assessment of various theories, concepts, approaches to building a system of continuous education; - ways of replenishing professional knowledge based on the use original sources, including electronic and in a foreign language, from various areas of general and professional culture; - technologies for conducting experimental work, participation in innovative processes.

Description of discipline	
Code of discipline	ZTO 3308
Name of discipline	Digital technologies in education
Number of credits (ESTS)	6
Course, semester	6
Department	Information Systems
Course author(s)	Tursynkhan A.
Prerequisites	Information and communication technologies
Postrequisites	Computer video editing and animation
The aim of study of a discipline	exploring different use cases for digital
Brief course description (main sections)	technologies outside of computer science and directly the IT industry
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	- know the main applications of digital technologies in the humanitarian field for processing, analyzing and storing unstructured data. - understand the basic principles of analyzing unstructured data. - be able to use some libraries to analyze unstructured data.

Description of discipline	
Code of discipline	OII 4217
Name of discipline	Artificial Intelligence Fundamentals
Number of credits (ESTS)	5
Course, semester	7
Department	Information Systems
Course author(s)	Altayeva A.
Prerequisites	Programming 3
Postrequisites	Graduation project
The aim of study of a discipline	reflection in it of the main directions and methods used in the field of artificial intelligence, both at the stage of analysis and at the stage of development and implementation of the simplest intelligent systems.
Brief course description (main sections)	The course provides basic information about artificial intelligence, expert systems, logic programming, pattern recognition theory, methods and tools for data mining. This course is related to the study of one of the sections of modern informatics and is designed to form

	ideas about the basic concepts of artificial intelligence and data mining
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: - features of functioning and solving problems by intelligent information systems; - areas of application of intelligent information systems; - basic methods of building intelligent information systems; - structure and general scheme of IMS functioning; - methods of knowledge representation in IIS; - IMS application areas; - stages, methods and tools for designing IMS. Be able to: - analyze the subject area and determine the tasks for the solution of which it is advisable to use technologies of intelligent systems; - form requirements for a subject-oriented intellectual system and determine possible ways of their implementation; - formulate and solve the problems of designing professionally oriented information systems with using technologies of intelligent systems; - to develop methods for maintaining the knowledge base in a working condition; Have skills and (or) experience of activities: - determining the requirements and composition of tools, methods and measures for the construction of intelligent information systems; - use of logical programming methods; - practical application of software tools and methods for constructing expert systems.

Description of discipline	
Code of discipline	KVA 4225
Name of discipline	Computer video editing and animation
Number of credits (ESTS)	5
Course, semester	7
Department	Information Systems
Course author(s)	Aytim A.
Prerequisites	Information and communication technologies
Postrequisites	Graduation project
The aim of study of a discipline	The purpose of the theoretical section of the discipline is to acquaint students with the conceptual and technological apparatus of this area of computer technology, to give basic ideas about the creation and use of multimedia in modern society. The purpose of the practical section (laboratory work) is to teach technologically competently organizing work on creating a multimedia application.
Brief course description (main sections)	The program is focused on deepening and expanding students' knowledge on the topics "Graphic Editors", "Computer Animation" and "Video Editing" and provides for the study of various types of graphics, color models, graphic file formats, laboratory work in various graphic editors. This course reveals to the students the amazing possibilities of computer graphics.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: - Theoretical foundations of converting analog information into digital and vice versa; - Basic file types and formats of raster and vector graphics; - Basic technologies for digital audio and video processing; - Approaches to creating animation and its main types;

	- Hardware requirements used to create multimedia products; - Stages and technologies for creating multimedia products. To be capable of: - develop multimedia products; - create and edit multimedia elements; - create presentations containing multimedia elements; - Post multimedia products on the Internet. Will be able: - skills of working design of multimedia objects; - skills in processing multimedia information; - skills of placing, testing and updating multimedia objects; - approaches to the use of information technology when creating a project for multimedia objects; - tools for creating and modifying multimedia objects; - skills of presentation of results in the form of presentations; - modern tools for creating, modifying and viewing a multimedia product.

Description of discipline	
Code of discipline	DO 3224
Name of discipline	Distance learning at school
Number of credits (ESTS)	5
Course, semester	7
Department	Information Systems
Course author(s)	Serbin V.V.
Prerequisites	Pedagogy, Information and Communication Technologies
Postrequisites	Graduation project
The aim of study of a discipline	formation of systematized knowledge in the field of distance learning methods.
Brief course description (main sections)	The effective use of ICT and the informatization of education in general requires the development of new educational technologies. The trends in this process are the development of new forms of education, including distance learning as an integral element of the modern pedagogical system.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: -the goals and objectives of distance learning; - forms, methods and techniques of distance learning with different groups of students; - basic information technologies used in distance learning. Be able to: - use modern information and communication technologies for implementation in educational process of distance learning; - organize educational material for a distance learning system based on computer telecommunications. Own: - modern methods of distance learning; - skills in creating multimedia projects in the distance learning system.

Description of discipline	
Code of discipline	TMO 3305
Name of discipline	Mobile learning technologies and augmented reality
Number of credits (ESTS)	5
Course, semester	7
Department	Information Systems
Course author(s)	Ukibasov B.

Prerequisites	Pedagogy
Postrequisites	Graduation project
The aim of study of a discipline	In this course, students can learn how to design, develop, troubleshoot, and publish their own mobile VR apps in Unity for Google Daydream, Gear VR, or Oculus Go devices. Using the latest techniques recommended by Unity VR engineers, create a complete VR environment that you can continue to use after the course, while learning to apply best practices in user experience, interaction, teleportation, and VR navigation design.
Brief course description (main sections)	The course provides basic information about virtual, augmented and mixed reality, basic concepts, relevance and prospects of these technologies; to develop the ability to work with specialized software (augmented reality tools, graphic 3D editors); teach the basics of shooting and editing video 360
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know mobile learning Be able to use basic mobile teaching devices and software Understand the use of social learning approaches Know trends in mobile learning and have strategies to adapt to them Understand pedagogy relevant to mobile learning. Create a complete VR environment

Description of discipline	
Code of discipline	ITO 3307
Name of discipline	Innovative technologies in the organization of the educational process at school
Number of credits (ESTS)	4
Course, semester	7
Department	Information Systems
Course author(s)	Sharipov B. Zh.
Prerequisites	Pedagogy
Postrequisites	Graduation project
The aim of study of a discipline	Raising the level of professional training of students in the field of innovative development of educational institutions; familiarization with the theoretical and methodological aspects of innovation in education; training in methods of modeling the innovation process through the use of innovative technologies; the formation of the motivational orientation of students towards innovative activities.
Brief course description (main sections)	The course examines the formation of students' competencies in the field of creating projects on programmable logic controllers; the study by students of the main programming languages for programmable logic controllers; mastering by students the skills of working with programmable logic controllers;
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know the theoretical foundations of innovative pedagogy in the context of their dynamics and world experience. To be able to use the knowledge gained in the practice of everyday activities and in solving specific pedagogical problems; to use in practice the existing conceptual apparatus; to present the acquired knowledge with a projection on future professional activity. Own the principles, technologies of innovation.

Description of discipline	
Code of discipline	ZRO 4310
Name of discipline	Digital resources in education
Number of credits (ESTS)	5
Course, semester	7
Department	Information Systems

Course author(s)	Sharipov B. Zh.
Prerequisites	Innovative technologies in the organization of the educational process at school
Postrequisites	Graduation project
The aim of study of a discipline	Raising the level of professional training of students in the field of innovative development of educational institutions; familiarization with the theoretical and methodological aspects of innovation in education; training in methods of modeling the innovation process through the use of innovative technologies; the formation of the motivational orientation of students towards innovative activities.
Brief course description (main sections)	The course is devoted to the development of the formation of future teachers of special ICT competence in the design of digital educational resources, which provides, in particular, the formation of: ICT competencies in the design of lessons using Digital resources in education; ICT competencies in the field of analysis and selection of ready-made digital educational resources that are adequate to educational goals in mathematics, computer science and physics.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	have an idea: - about the possibilities of digital equipment and digital educational resources to create an educational environment; - on the application of acquired knowledge and skills in professional activities related to the teaching of other academic subjects. As a result of mastering the academic discipline, the student must be able to: - comply with safety and hygiene regulations recommendations when using ICT tools and digital equipment in professional activity; - create, edit, design, save, transfer information objects of various types using modern information technology and digital equipment to provide educational process; know: - safety regulations and hygiene requirements for use of ICT tools and digital equipment in educational process; - the possibility of using digital equipment and digital educational resources in the educational process of primary school; - software for digital equipment; - basic technologies of creation, editing, design, saving, transferring and searching information objects of various types with using modern software tools;

Description of discipline	
Code of discipline	OND 4309
Name of discipline	Fundamentals of scientific activity in the school computer science course
Number of credits (ESTS)	5
Course, semester	7
Department	Information Systems
Course author(s)	Duysebekova K.S.
Prerequisites	No
Postrequisites	Graduation project
The aim of study of a discipline	The aim of the course is to prepare the student for work as a computer science teacher in a general education school for scientific activities in the school course, to provide students with a deep study of the scientific and psychological and pedagogical foundations of the structure and content of the computer science course in secondary educational

	institutions, understanding the methodological ideas inherent in them, educating future teachers the ability to solve the problems of teaching informatics for scientific activity by a schoolchild, the formation of skills in an independent learning process, methodological creativity.
Brief course description (main sections)	The program is designed to provide theoretical and practical training for teachers in the field of teaching methods of informatics.
Expected Learning Outcomes (knowledge, abilities, skills and competencies acquired by students)	Know: - fundamentals of informatics; - the structure of hardware and software of personal computers; - the current state of the level and directions of development of computer technology and software tools. Be able to: - work on a personal computer in various operating systems; - work in local and global computer networks; - use external media for data exchange. Own: - basic methods of working on a personal computer; - the skill of working in local and global computer networks; - the basics of programming the solution of the simplest problems on a computer.