

The list of academic disciplines of the university component

6B06 - Information and Communication Technologies
(Code and classification of the field of education)

6B061 - Information and communication technologies
(Code and classification of the direction of training)

0610
(Code in the International Standard Classification of Education)

B057 - Information technology
(Code and classification of the educational program group)

6B06105 - Computer Engineering and Software/Smart Computing
(Code and name of the educational program)

bachelor
(Level of preparation)

set of 2023

Developed

By the Academic Committee of the OP
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Reviewed

At the meeting of the Quality Assurance Commission of the Faculty of Engineering and Technology
Recommended for approval by the Academic Council of the University
Protocol № 4/6 «10» April 2023
Chairman of the Commission on Quality Assurance Abdilova G.B.

Approved at the meeting of the Academic Council of the University Protocol No. 8 "25" April 2023.

Approved

at the meeting of the Academic Council of the University
Protocol № 1 "01" of September 2023
Chairman of the Academic Council of the University Orynbekov D.R.

Bases of economics, law and ecological knowledge

Discipline cycle	General educational disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The integrated discipline includes the main issues and principles in the field of fundamentals of law and anti-corruption culture, economics, entrepreneurship and leadership, ecology and life safety. Features of the use of regulatory legal acts, the ability to use the business, ethical, social, economic, entrepreneurial and environmental standards of society. Specifics of environmental-legal, economic, entrepreneurial relations, leadership qualities and principles of combating corruption.

Purpose of studying of the discipline

It consists in studying the basic patterns of the functioning of living organisms, the biosphere as a whole and the mechanisms of their sustainable development under the conditions of anthropogenic impact and emergency situations; in understanding the concept of corruption, the legitimacy of the fight against it, the content of the state penal policy; in the formation of students' basic fundamental stable knowledge on the basics of economic theory, in instilling the skills and abilities of economic thinking; in introducing students to the theory and practice of entrepreneurship, to the basics of creating their own business; in the formation of theoretical knowledge and practical skills for the development and improvement of leadership qualities.

Learning Outcomes

ON 1 To demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, to apply information technologies, taking into account current trends in the development of society.

Learning outcomes by discipline

- 1. analyzes the issues of safety and conservation of the natural environment as the most important priorities of life;*
- 2. demonstrates knowledge of the fundamentals of nature management and sustainable development, assesses the impact of man-made systems on the environment;*
- 3. shows knowledge of the main regulatory legal acts of the Republic of Kazakhstan, their understanding and application;*
- 4. shows knowledge of the patterns of development of economic processes, clearly formulates his own position, finds and clearly sets out arguments in its defense;*
- 5. is able to characterize the types of entrepreneurial activity and the entrepreneurial environment, draw up a business plan, create an entrepreneurial structure and organize its activities;*
- 6. knows the fundamental provisions about the role of leadership in managing large and small social groups.*

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Discrete Mathematics with Applications

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This subject is a mathematics course designed specifically for students of computer science and software engineering. The course covers logic, set theory, relations, graph theory, etc. The course will cover various topics such as mathematical induction, inductive hypothesis, mathematical logic. Mathematical proofs, relational functions, mappings, graphs and abstract algebra (binary operations, commutative and associative operations, etc.).

Purpose of studying of the discipline

To familiarize the student with the basics of discrete mathematics as a theoretical basis for programming.

Learning Outcomes

ON 2 To demonstrate competencies in the field of business (professional) communication in a multilingual environment, as well as to have a look at the general culture of the world.

Learning outcomes by discipline

- 1) Applies discrete mathematics methods when working with applications.*
- 2) Explores logical operations, logical formulas, laws of logical algebra.*
- 3) Demonstrates knowledge in the field of operations on sets and applies the apparatus of set theory to solve problems.*

Prerequisites

School course

Postrequisites

Decision Support Systems

Information Systems

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

In this course, students will learn the basic concepts of business technology in electronic form. After completing the training, students will acquire practical skills in the field of information systems, organization of hardware and software, organization of storage and processing of data and information. Students will gain an understanding of e-business concepts, applications and technologies such as electronic payment systems, ATMs and cards.

Purpose of studying of the discipline

The purpose of mastering the discipline is to develop students' professional competencies in the field of modern information technologies.

Learning Outcomes

ON 5 To use various support programs, best practices and functions that are necessary for professional development

Learning outcomes by discipline

- 1) Briefly outlines the basic concepts of information technology.*
- 2) Uses methods for integrating different types and classes of information technologies.*
- 3) Demonstrates knowledge of e-business concepts, applications and technologies.*

Prerequisites

School course

Postrequisites

Computer & Information Security

Korean I

Discipline cycle	Basic disciplines
Course	1
Credits count	6
Knowledge control form	Examination

Short description of discipline

The course is designed to form students' communicative competencies in the Korean language. The course is divided into 4 levels. "Korean 1" is aimed at getting acquainted with the main phonological, morphological and syntactic characteristics of the Korean language. An introductory phonetic course is conducted and articulatory properties and intonation are studied. Students receive information about the alphabet, learn the basics of alpha-syllabic writing and core vocabulary.

Purpose of studying of the discipline

The purpose of this course is to master and consolidate knowledge and competencies in the field of modern Korean language - standard phonetics, graphics, grammar and vocabulary to the extent provided for in this program.

Learning Outcomes

ON 2 To demonstrate competencies in the field of business (professional) communication in a multilingual environment, as well as to have a look at the general culture of the world.

Learning outcomes by discipline

To demonstrate competencies in the field of business (professional) communication in a multilingual environment, as well as to have a look at the general culture of the world.

Owns the normative pronunciation and rhythm of speech and apply them for everyday communication.

Has the skills of hieroglyphic writing, to the extent determined by the material of the program.

Owns vocabulary in the amount determined by the material of the advanced level textbook.

Possesses socio-cultural and regional knowledge, allowing confident orientation in various texts and communicative situations, in the scope of this course.

Knows the phonetic and lexical-grammatical structure of the Korean language.

Has grammatical skills to understand language materials about everyday and professional life; the skills of conducting a conversation and dialogue in Korean in the amount provided for by this program, uses adequate socio-cultural models of communication in typical situations.

Prerequisites

School course

Postrequisites

Korean II

Multicultural Studies

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course helps students understand and expand their knowledge of the different cultures around them. Given globalization and localization, to be a professional in the future, you need to become a multicultural person who approaches everything with an open mind. Students will become familiar with other cultures with an understanding of their own biases and prejudices. But they will be open to understanding with others and should develop their own identity.

Purpose of studying of the discipline

Multicultural learning complements a student's overall educational experience, covering a wide range of perspectives on cultural experiences in Kazakhstan, the United States, and other countries.

Learning Outcomes

ON 1 To demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, to apply information technologies, taking into account current trends in the development of society.

Learning outcomes by discipline

1) Uses the ability to correctly interpret specific manifestations of communicative behavior (verbal and nonverbal) in various cultures.

2) Forms a tolerant attitude towards representatives of other cultures and languages.

3) Demonstrate their identity.

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Fundamentals of algorithmization

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course is designed for students to master the issues of constructing algorithms and programs for various tasks. The course covers topics such as problem statement, the main stages and ways of solving problems: mathematization, algorithmization, programming, debugging and program execution.

The development of computer programs is carried out according to a certain rule, the stages of which are: formulation of the problem; creation of the program project; creation of the model; construction of the algorithm; implementation of the algorithm; research of the algorithm and its complexity; testing of the program; documentation.

Purpose of studying of the discipline

The purpose of the discipline is to study the basics of algorithmization for solving programming problems. It is important for a modern programmer not only to have knowledge about the principles of computer operation and the capabilities of its software, he must also be able to formulate a problem, create its mathematical and software model, know various ways to solve the problem, be able to analyze the resulting solution.

Learning Outcomes

ON 5 To use various support programs, best practices and functions that are necessary for professional development

ON 6 To use the basic laws of natural sciences in professional activities, methods of mathematical analysis and modeling, theoretical and experimental research

Learning outcomes by discipline

ON 6 To use the basic laws of natural science disciplines in professional activity, methods of mathematical analysis and modeling, theoretical and experimental research

1. Describe the basics of the theory of algorithms
2. Create an algorithm for solving the problem
3. Demonstrate programming skills in high-level algorithmic languages
4. Make a decision when choosing an algorithm for solving the problem
5. Demonstrate knowledge of the rules for setting and solving practical problems.

Prerequisites

School course

Postrequisites

Programming Technologies

Statistics

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course will introduce students to the basic concepts and methods of probability theory and statistics. It provides an overview of the main probability distributions: the binomial distribution, the normal distribution, and the sampling distribution. This will help students become familiar with statistical methodologies for analyzing quantitative and qualitative data, such as interval estimation, hypothesis testing, regression analysis, categorical data analysis, and analysis of variance, which can be used to solve real-world statistical problems.

Purpose of studying of the discipline

Mastering the competencies necessary for training personnel who possess a modern methodology for collecting, processing, and summarizing statistical information

Learning Outcomes

ON 4 To analyze the main world outlook and methodological problems, including cross-disciplinary ones, arising in science at the present stage of its development as well as to use its results in professional activities

Learning outcomes by discipline

- application of statistical methods to identify patterns and dependencies in the studied phenomena;
- application of statistical methods to evaluate the effectiveness of implemented recommendations, decisions made, incl. managerial

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Programming Language I

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

In this course, students will gain knowledge of the fundamentals of programming languages and become familiar with the theory, design,

and implementation of programming languages. This course provides a deep and basic understanding of how the basic processes of computer programming work. The course is very useful for freshers who want to pursue a career in a leading IT company. Learning C programming always gives a clear insight into learning a more advanced high-level language.

Purpose of studying of the discipline

The goal of the discipline is to develop the ability to master techniques for using software to solve practical problems. Obtaining knowledge and programming skills in a high-level language, independent acquisition with the help of information technology and the use of new knowledge and skills in practical activities.

Learning Outcomes

ON 5 To use various support programs, best practices and functions that are necessary for professional development

Learning outcomes by discipline

- 1) Apply algorithmization methods.
- 2) Use a programming language to describe algorithms.
- 3) Draw conclusions from the software code.
- 4) Use tools for integrating software modules.

Prerequisites

School course

Postrequisites

Programming Language II

Korean II

Discipline cycle	Basic disciplines
Course	1
Credits count	6
Knowledge control form	Examination

Short description of discipline

Students learn to create sentences using an 800-word vocabulary and basic grammar structures. Topics are the phrase structure and the choice of lexical units; Chinese and European borrowings; polite formal style. By the end of the first year, students complete A1 (survival level) of the "Common European Framework of Reference for Languages" or Level 1 of 6 of the TOPIK Korean National Exam.

Purpose of studying of the discipline

Acquisition of knowledge and competencies in the field of the modern Korean language - phonetics, normative grammar and vocabulary in the amount provided for by this program.

Learning Outcomes

ON 2 To demonstrate competencies in the field of business (professional) communication in a multilingual environment, as well as to have a look at the general culture of the world.

Learning outcomes by discipline

- make sentences using a dictionary of 800 words and basic grammatical structures;
- use Chinese and European borrowings;
- use a polite formal style.

Prerequisites

Korean I

Postrequisites

Korean III

System Analysis & Design

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course examines the processes, methods, and problems related to the analysis and design of information systems. Requirements analysis, system development life cycle, structural design, feasibility study, installation and implementation are some of the topics covered. To effectively participate in the creation and maintenance of systems, any IT graduate working in the IT sector must have knowledge and possess the necessary abilities in systems analysis and design.

Purpose of studying of the discipline

To provide students with knowledge of the basics of system analysis and its methods. Provide design skills using systems analysis.

Learning Outcomes

ON 6 To use the basic laws of natural sciences in professional activities, methods of mathematical analysis and modeling, theoretical and experimental research

Learning outcomes by discipline

- 1) Адам өміріндегі объективті мазмұнды құру, өндіру және пайдалану циклін ұйымдастыру негіздерін көрсетеді.
- 2) Адам өмірінің жасанды пәндік ортасын жетілдіру мәселелерін шешеді.
- 3) Жеке кәсіптік қызығушылықтарды қанағаттандыру үшін оқу мақсаттарын қалыптастырады.

Prerequisites

Discrete Mathematics with Applications

Postrequisites

Fundamentals of information security

Educational practice

Discipline cycle	Basic disciplines
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Course	1
Credits count	2
Knowledge control form	Total mark on practice

Short description of discipline

The student gets acquainted with the organization and activities of the enterprise according to the profile of the educational program and receives a primary idea of the scope of future professional activity.

Purpose of studying of the discipline

Give students an initial idea of the field of professional activity

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games

Learning outcomes by discipline

- 1) Uses computer methods of signal processing and mathematical modeling.
- 2) Demonstrates knowledge in the field of modern computer technologies.
- 3) Applies methods for solving practical problems in the field of programming.

Prerequisites

Programming Language I

Postrequisites

Internship I

Programming Language II

Discipline cycle	Basic disciplines
Course	1
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course provides students with a basic understanding of how to apply the basic concepts of procedural programming to the C++ programming language. This course covers programming principles and structures such as data types, classes, objects, constructors, abstract classes, polymorphism, encapsulation, and inheritance. This course is very useful for entry level students who want to further their career in a world class IT company and learn about smart computing.

Purpose of studying of the discipline

The objectives of the course are to familiarize students with the vocabulary of the language, its syntactic constructions and the standard library of the language; to familiarize them with the ways of processing information using the means of the programming system.

Learning Outcomes

ON 5 To use various support programs, best practices and functions that are necessary for professional development

Learning outcomes by discipline

- 1) Uses programming languages and systems, tools to solve professional, research and applied problems.
- 2) Interprets the general principles of construction and use of modern high-level programming languages.
- 3) Shows knowledge in the field of developing system and application software using high-level programming languages.

Prerequisites

Programming Language I

Postrequisites

Computer & Information Security

Operations Research

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline develops the student's theoretical knowledge and practical skills on issues related to management decision-making; teaches the use of operations research methods and models in the process of preparing and making management decisions. According to the requirements for training in this educational program, students must have knowledge in the field of research of mathematical and software models of computational processes, methods of algorithmization and implementation of models, analyze and optimize processes in control systems.

Purpose of studying of the discipline

The goal of the discipline is to master the basic ideas of methods, features of areas of application and methods of using them as a ready-made tool for practical work in the design and development of systems, mathematical data processing, construction of algorithms and organization of computational processes.

Learning Outcomes

ON 5 To use various support programs, best practices and functions that are necessary for professional development

Learning outcomes by discipline

1. Explores logical operations, logic formulas, laws of algebra of logic
2. Create software blocks to solve assigned tasks
3. Create linear programming models and analyze models.

Prerequisites

Programming Technologies Software Architecture Software Design

Postrequisites

Database Management Systems Distributed and centralized database RDBMS concepts and Oracle

Korean III

Discipline cycle	Basic disciplines
Course	2
Credits count	6
Knowledge control form	Examination

Short description of discipline

In this discipline, students master a certain array of vocabulary (1500-2000 words), common speech turns and idiomatic expressions of the language, which are typical for monologue and dialogic written and oral speech. Most of the situations that arise during your stay on the Korean Peninsula (bank, market, post office, etc.) are considered. Students master the skills of telling about their intentions and dreams, assessing events, and briefly substantiating their views.

Purpose of studying of the discipline

Acquisition of knowledge and competencies in the field of the modern Korean language - phonetics, normative grammar and vocabulary in the amount provided for by this program.

Learning Outcomes

ON 2 To demonstrate competencies in the field of business (professional) communication in a multilingual environment, as well as to have a look at the general culture of the world.

Learning outcomes by discipline

- 1) Demonstrates the ability and willingness to conduct intercultural dialogue in the Korean language.*
- 2) Demonstrates knowledge of grammar, vocabulary and extralinguistic features of the Korean language.*
- 3) Reads and can write formal and informal letters, observing the necessary rules of politeness.*

Prerequisites

Korean II

Postrequisites

Korean IV

World of Abai

Discipline cycle	Basic disciplines
Course	2
Credits count	3
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying historical facts, the philosophical and artistic foundations of the works of Abay Kunanbaev, Shakarim Kudaiberdiev, which form worldview and aesthetic values, the student's ability to express his opinion, practical skills and perception of such human qualities as morality, honesty, artistic character. The genius of the writers of Kazakh literature and the role of M. Auezov in the study and popularization of Abai's heritage, the significance of his works for history, literature and science are determined.

Purpose of studying of the discipline

Formation of the meaning of philosophical and ideological being, understanding of the problems raised in the works of Abai Kunanbayuly, Shakarim Kudaiberdiuly, Mukhtar Auezov and application of the acquired knowledge in the practice of everyday life.

Learning Outcomes

ON 1 To demonstrate socio-cultural, economic, legal, environmental knowledge, communication skills, to apply information technologies, taking into account current trends in the development of society.

Learning outcomes by discipline

- 1) Analyzes the philosophical and artistic foundations of works, historical facts related to the creative heritage of Abai Kunanbayev, Shakarim Kudaiberdiyev, Mukhtar Auezov*
- 2) Uses in practice the humanistic ideas of Abai's philosophical and artistic works*
- 3) Assesses the place and significance of Abai's works in the history of literature and science*

Prerequisites

School course

Postrequisites

Basic and profile disciplines of the EP

Object-Oriented Programming with Java

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course aims to introduce students to the fundamentals of object-oriented programming using the Java programming language. Students will use several important APIs while learning Java programming skills. The emphasis in the course is on the object-oriented nature of the Java programming language and its use of elements of polymorphism. Hands-on exercises enable participants to become highly skilled Java application developers.

Purpose of studying of the discipline

Introduce students to programming in Java.

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games

Learning outcomes by discipline

- 1) Demonstrates knowledge in the field of algorithmic decomposition, basic data structures and technologies for working with it.*
- 2) Demonstrates skills in developing programs in high-level languages.*

3) Shows knowledge in the field of design and architectural patterns for building information systems.

Prerequisites

Programming Language II

Postrequisites

Computer Graphics

Games Theory and Implementation

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course provides students with an understanding of the process of developing and implementing computer games. The course provides the basic principles of the theory and logic of the game development process, digital interactions, player interaction, storytelling, and so on. This discipline introduces students to game engines and the game development environment, develops practical skills in assessing and using the resources necessary for the development and implementation of games.

Purpose of studying of the discipline

The goal of the discipline is to develop in students systematized knowledge in the field of decision-making theory based on the use of methods for solving matrix, convex, non-antagonistic and positional games and an understanding of the mathematical and logical foundations of modern information technologies and, on this basis, a holistic picture of the world.

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games

Learning outcomes by discipline

- 1) Briefly outlines the basic concepts and concepts of game theory.*
- 2) Demonstrates skills in analyzing practical situations from a game-theoretic point of view.*
- 3) Uses the acquired knowledge to analyze management situations.*

Prerequisites

System Analysis & Design

Postrequisites

Computer Graphics

Interfaces of computer systems

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

The discipline "Computer System Interfaces" teaches students modern methods and technologies for interprogram data exchange, programming interface system tasks for the Windows operating system, and software and hardware features for controlling computer equipment through a programming language.

Computer system interfaces are the basis for the interaction of all modern computing and information systems. If the interface of an object, any one, does not change, this makes it possible to change the object without changing the rules of its interaction with other objects.

Purpose of studying of the discipline

The purpose of the discipline is to train students in the field of creating interaction interfaces in computer systems based on modern computer technologies.

Learning Outcomes

ON 11 To develop mobile apps with AndroidStudio, to write programs in Java, C ++, C#, HTML, CSS, to analyze and to implement securities protection tools for mobile devices and their applications, as well as web applications, to create and to host websites on the Internet, to create domain names and to deploy servers

Learning outcomes by discipline

- 1. Explore the problems of creating an interaction interface in computer systems*
- 2. Create hardware and software tools for organizing a dialogue between operators and the software system*
- 3. Create forms of dialogue interaction.*

Prerequisites

Programming Technologies Software Architecture Software Design

Postrequisites

Web Applications Development

Computer Graphics

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Examination

Short description of discipline

This module provides the learner with knowledge of various concepts, techniques and algorithms used in computer graphics. The module has great professional potential, especially for students who are interested in studying industrial design, gaming technology and networking.

Purpose of studying of the discipline

Teach industrial design technologies, gaming technologies and animation

Learning Outcomes

ON 11 To develop mobile apps with AndroidStudio, to write programs in Java, C++, C#, HTML, CSS, to analyze and to implement securities protection tools for mobile devices and their applications, as well as web applications, to create and to host websites on the Internet, to create domain names and to deploy servers

Learning outcomes by discipline

- 1) Briefly outlines concepts in the field of computer graphics.
- 2) Briefly outlines design standards and regulatory and technical documentation in the field of computer graphics.
- 3) Uses standard software products aimed at solving design and technological problems.

Prerequisites

Games Theory and Implementation Object-Oriented Programming with Java

Postrequisites

2D Computer Animation

Korean IV

Discipline cycle	Basic disciplines
Course	2
Credits count	6
Knowledge control form	Examination

Short description of discipline

The discipline prepares students for studying in South Korea. In addition to intensive language training, information about the culture, history and current situation of South Korea is provided through multimedia.

By the end of the second year, students on average complete A2 level (pre-threshold level) of the "Common European Framework of Reference for Languages" or Level 2 of 6 of the TOPIK Korean National Exam.

Purpose of studying of the discipline

Acquisition of knowledge and competencies in the field of the modern Korean language - phonetics, normative grammar and vocabulary in the amount provided for by this program.

Learning Outcomes

ON 2 To demonstrate competencies in the field of business (professional) communication in a multilingual environment, as well as to have a look at the general culture of the world.

Learning outcomes by discipline

- 1) Demonstrates fluency in the Korean language.
- 2) Reads Korean texts of different levels of complexity: both news articles and light literary texts.
- 3) Uses knowledge of ethnographic, ethnolinguistic and ethnopsychological characteristics.

Prerequisites

Korean III

Postrequisites

Basic and profile disciplines of the EP

Internship I

Discipline cycle	Basic disciplines
Course	2
Credits count	5
Knowledge control form	Total mark on practice

Short description of discipline

Студент кәсіпорында тәжірибелік сабақтар кезінде алған теориялық білімін практикалық іс-әрекеттермен бекітеді, сонымен қатар қажетті дағдыларды меңгереді.

Purpose of studying of the discipline

Mastering the methodology of design, implementation and operation of individual tasks and subsystems of information systems, studying automated tools and systems that implement information systems, acquiring skills in research and design of information system subsystems.

Learning Outcomes

ON 5 To use various support programs, best practices and functions that are necessary for professional development

Learning outcomes by discipline

- 1) Applies computer/supercomputer methods, modern software, including those of domestic origin, to solve professional problems.
- 2) Explores the problems of creating algorithms for solving problems and describing them using programming languages.
- 3) Demonstrates theoretical knowledge of the principles of program construction, debugging, modification and maintenance.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Basic and profile disciplines of the EP

2D Computer Animation

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course examines the prospects for the development of computer technology. Students will be trained in the tools and techniques

used to model, process, capture, display and store 2D and 3D scenes, digital photographs, animation and video. In addition, students will gain practical skills in working with 3D modeling and animation software. Students will be required to complete assignments that demonstrate their understanding of the program, concept development, and implementation.

Purpose of studying of the discipline

The purpose of the discipline is to form students' ideas about the tools and approaches associated with the development of computer animation. Obtaining theoretical and practical knowledge about computer animation.

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games

Learning outcomes by discipline

- 1) Demonstrates knowledge of the history of the development of computer graphics and the scope of its application.
- 2) Uses computer graphics and animation hardware.
- 3) Applies methods for creating and editing simple graphic images and animation.
- 4) Applies the results of mastering the discipline in professional activities.

Prerequisites

Computer Graphics

Postrequisites

Computer Games Programming & Game Engine Fundamentals of game design Game development for mobile platforms

Parallel and Distributed Computing

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

Modern computer systems are distributed and parallel. This course covers general introductory concepts in the design and implementation of parallel and distributed systems, covering all major industries such as cloud computing, grid computing, cluster computing, supercomputing, and multi-core computing. Topics that will be covered in this course include asynchronous/synchronous computing/communications, concurrency control, fault tolerance, etc.

Purpose of studying of the discipline

Provide an integrated understanding of various aspects of distributed and parallel computing using various techniques and concepts.

Learning Outcomes

ON 8 To have skills in using platforms such as HADOOP, SPARK, etc., big data and cloud systems, to have deep knowledge of database management to analyze data collections and to create documentation, to process large databases of large-scale machine learning, to create configurations for cloud server systems and clients

Learning outcomes by discipline

- 1) Uses the principles of construction and operation of hardware and software systems designed for parallel computing.
- 2) Demonstrates the ability to in-depth analysis of problems, formulation and justification of tasks of scientific and design-technological activities.
- 3) Explores hardware and software of parallel systems in computing.

Prerequisites

Discrete Mathematics with Applications

Postrequisites

Final examination

Web Applications Development

Discipline cycle	Profiling discipline
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

The course focuses primarily on creating rich client web applications in the browser. The course is divided into various modules covering the following technologies in detail: Flash & Flex 3 (Adobe), AJAX (Asynchronous Javascript and XML), GWT (Google Web Toolkit), Silverlight (Microsoft) and JavaFX. Several applications will be presented as case studies. Upon completion of this course, students will be proficient in the latest and widely used web application development methodologies.

Purpose of studying of the discipline

The purpose of the discipline is to study modern methods and software used in the development of web applications. As a result of studying the discipline, students must learn to develop software system projects based on an object-oriented approach to software design.

Learning Outcomes

ON 11 To develop mobile apps with AndroidStudio, to write programs in Java, C ++, C#, HTML, CSS, to analyze and to implement securities protection tools for mobile devices and their applications, as well as web applications, to create and to host websites on the Internet, to create domain names and to deploy servers

Learning outcomes by discipline

- 1) Identifies common characteristics of different types of data and processes them using the principles of object-oriented design.
- 2) Demonstrates practical skills in creating and developing web applications.
- 3) Uses a modern strategy for the development and implementation of web applications.

Prerequisites

Operating system concepts and network management Network Infrastructure and Management Network Administration and Design

Postrequisites

User Experience Design

User Experience Design

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course covers the basic concepts of user experience and interaction design. Course content includes concepts about fundamental concepts, practices, workflows, and tools associated with the practice of designing user interfaces on the web and mobile devices. Students acquire practical skills in designing and creating prototypes of user interfaces and frameworks; interactive design and testing processes.

Purpose of studying of the discipline

The purpose of studying the discipline is to acquire knowledge, skills and abilities in creating digital products, developing the appearance of websites and mobile applications, designing user experience and analyzing the target audience.

Learning Outcomes

ON 10 To plan and to implement network infrastructure, to manage Windows and Linux platform for the smooth operation of the organization, to develop IoT systems with in-depth knowledge of UI/UX design, to handle data communication hardware such as servers, switches, routers, etc

Learning outcomes by discipline

- 1) Solve standard problems of professional activity on the basis of information and bibliographic culture using information and communication technologies and taking into account the basic requirements of information security No.*
- 2) Forms organizational, technical and economic processes using methods of system analysis and mathematical modeling.*
- 3) Demonstrates knowledge of the systemic organization of the user interface in modern operating systems and environments and formal methods for describing dialog systems.*

Prerequisites

Web Applications Development

Postrequisites

Android Application Development

Linux Operating Systems & Networking

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course is an introduction to the Linux operating system, primarily focused on using the command line. It is well known that the Internet is a global network that is profoundly changing social, political and economic systems, and in some cases, erasing geographical boundaries. Designing and managing such a network requires an understanding of how network behavior and protocols can be implemented in the operating system.

Purpose of studying of the discipline

The purpose of the discipline is to study the problems of administering Linux servers, the classification of operating systems and the software used for administering Linux servers, as well as the theoretical and practical foundations of administering local networks based on Linux operating systems.

Learning Outcomes

ON 10 To plan and to implement network infrastructure, to manage Windows and Linux platform for the smooth operation of the organization, to develop IoT systems with in-depth knowledge of UI/UX design, to handle data communication hardware such as servers, switches, routers, etc

Learning outcomes by discipline

- 1) Uses the Linux shell and programs to solve a wide range of everyday tasks.*
- 2) Demonstrates knowledge in the field of operating systems, network technologies, software interface development tools, the use of languages and methods of formal specifications, database management systems.*
- 3) Demonstrates the ability to use the features of UNIX systems when working in Linux.*

Prerequisites

Operating Systems System software Operating system concepts and network management

Postrequisites

Final examination

Internship II

Discipline cycle	Basic disciplines
Course	3
Credits count	5
Knowledge control form	Total mark on practice

Short description of discipline

The student consolidates the acquired theoretical knowledge with practical actions during practical training at the enterprise, and also acquires the necessary skills.

Purpose of studying of the discipline

Mastering the methodology of design, implementation and operation of individual tasks and subsystems of information management systems, studying automated systems that implement information systems, acquiring skills in research and design of information system subsystems.

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games
ON 10 To plan and to implement network infrastructure, to manage Windows and Linux platform for the smooth operation of the organization, to develop IoT systems with in-depth knowledge of UI/UX design, to handle data communication hardware such as servers, switches, routers, etc

ON 11 To develop mobile apps with AndroidStudio, to write programs in Java, C ++, C#, HTML, CSS, to analyze and to implement securities protection tools for mobile devices and their applications, as well as web applications, to create and to host websites on the Internet, to create domain names and to deploy servers

Learning outcomes by discipline

1) Demonstrates knowledge of theoretical and practical aspects of the transition from a meaningful formulation of a problem to the development of an algorithm for solving it. Clearly imagine the algorithmic system within which the algorithm is compiled, imagine and take into account the capabilities of the algorithm executor (human or computer).

2) Uses modern programming systems to develop program code, interprets the results of his developments.

3) Applies the acquired knowledge to solving issues of compiling and documenting algorithms, developing programs and their maintenance, using modern tools and technologies.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Basic and profile disciplines of the EP

Decision Support Systems

Discipline cycle Profiling discipline

Course 3

Credits count 5

Knowledge control form Examination

Short description of discipline

Through this course, students will learn how to manage and use decision support systems. Ways of using DSS capabilities in various decision-making processes are considered. Topics covered in this course are Decision Support Systems Overview, Modeling and Support, DSS Concept, Methodology and Technologies, Modeling and Analysis, Data Mining, Data Storage, Group Support Systems, Knowledge Management, Artificial Intelligence and Expert Systems.

Purpose of studying of the discipline

To give an idea of the decision support system

Learning Outcomes

ON 8 To have skills in using platforms such as HADOOP, SPARK, etc., big data and cloud systems, to have deep knowledge of database management to analyze data collections and to create documentation, to process large databases of large-scale machine learning, to create configurations for cloud server systems and clients

Learning outcomes by discipline

1) Finds organizational and management solutions and is ready to bear responsibility for them.

2) Demonstrates knowledge of trajectory management goals, structured and semi-structured management tasks.

3) Explores information flows in the enterprise.

4) Solve the problems of analytical information processing in the process of corporate governance

Prerequisites

Discrete Mathematics with Applications

Postrequisites

Data Science Data Mining Concepts and Techniques Introduction to Data Warehousing Fundamentals

Virtual Reality

Discipline cycle Basic disciplines

Course 4

Credits count 5

Knowledge control form Examination

Short description of discipline

Бұл курс OpenGL, нақты уақыттағы рендеринг, 3D рендеринг жүйелері, дисплей оптикасы мен электроникасы, инерциялық өлшеу модульдері, бақылау, хаптика, графикалық құбыр желісі, адам мен тереңдіктің көп модельді қабылдауы, стерео рендеринг және қатысу сияқты тақырыптардың кең ауқымын қамтиды. Курс нақты әлемдегі бағдарламалау қиындықтары мен виртуалды шындық технологияларына баса назар аударады. Студенттің өзінің виртуалды ортасын құру курстың соңғы міндеті болып табылады.

Purpose of studying of the discipline

Train to develop IoT systems with deep knowledge in UI/UX design

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games

Learning outcomes by discipline

1) Plans to develop system software, hardware and software for supporting virtual reality and software for implementing simulation systems.

2) Offers a mathematical model for solving a problem in the field of professional activity.

3) Builds mathematical models and analyzes them when solving problems in the field of professional activity.

Prerequisites

Computer Games Programming & Game Engine Fundamentals of game design Game development for mobile platforms

Postrequisites

3D Modelling

Ethical Hacking

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

The main purpose of the course is to familiarize students with the principles of hacker ethics. The course covers codes of conduct and ethics of the attacking system. Students gain a basic understanding of the hacker's mindset and the basic elements that penetrate computer systems with the express purpose of protecting them from criminals. The course makes a very clear distinction between ethical and criminal hacking and gives tools to prevent and protect the system from cyber criminals

Purpose of studying of the discipline

The purpose of studying the discipline is to lay a terminological foundation, teach how to correctly analyze information security threats, perform the main stages of solving information security problems, consider the basic methodological principles of the theory of information security, study methods and means of ensuring information security, methods of violating the confidentiality, integrity and availability of information.

Learning Outcomes

ON 9 To identify intrusions using cybersecurity standards, to create and to maintain organizational security policies, to analyze malware and spyware; to apply critical and analytical thinking to the investigation of security anomalies

Learning outcomes by discipline

- 1) Uses modern information technologies to collect, process and analyze information.
- 2) Applies a systematic approach to solving assigned tasks.
- 3) Uses methods of searching, collecting, processing, storing, critical analysis and synthesis of information.
- 4) Applies the methodology of a systematic approach to solve assigned problems.
- 5) Demonstrates the ability to use digital resources to solve professional problems.

Prerequisites

Digital Forensics and Investigations Basics of Cyber Forensic Fraud and countermeasures in IT and telecommunications

Postrequisites

Final examination

3D Modelling

Discipline cycle	Basic disciplines
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course introduces students to 3D computer generated image (CGI) software and how it works. The course covers CGI modeling techniques, texturing, lighting, rendering and animation. Discusses ways to integrate 3D computer images into digital media. Students learn programming techniques using OpenGL for 3D graphic design. Familiarization with the principles of constructing dynamic objects and their application in practice.

Purpose of studying of the discipline

Obtaining theoretical knowledge and practical skills in the field of software and hardware organization of multimedia systems.

Learning Outcomes

ON 7 To know programming languages, such as C # and C ++, to work in the development of various programs and video games

Learning outcomes by discipline

- 1) Creates user interface models.
- 2) Lists the basic concepts of 3D modeling - the basics of working in a 3D editor.
- 3) Creates 3D models in the editor and edits them.
- 4) Uses a general technique for editing 3D models.

Prerequisites

Virtual Reality

Postrequisites

Final examination

Android Application Development

Discipline cycle	Profiling discipline
Course	4
Credits count	5
Knowledge control form	Examination

Short description of discipline

This course provides hands-on experience and exposure to mobile application development for Android devices. Starting with the basics, this course builds a solid knowledge base about the architecture and internals of Android. Subsequently, he dives into advanced Android use cases (media processing, connectivity, social networking, etc.) that will help students create a working application on their own.

Purpose of studying of the discipline

Provide an introduction to Android application development techniques.

Learning Outcomes

ON 11 To develop mobile apps with AndroidStudio, to write programs in Java, C ++, C#, HTML, CSS, to analyze and to implement securities protection tools for mobile devices and their applications, as well as web applications, to create and to host websites on the Internet, to create domain names and to deploy servers

ON 12 To apply in practice the formed personality-oriented qualities that contribute to the ability to correctly express thoughts, to build

evidence of one's point of view, to lead a discussion, to listen to another person, to demonstrate the ability to communicate and business communication skills

Learning outcomes by discipline

- 1) Describes the development tools available on the Android platform.*
- 2) Uses development tools available on the Android platform.*
- 3) Demonstrates skills in writing applications for mobile devices.*

Prerequisites

User Experience Design

Postrequisites

Final examination