NJSC SHAKARIM UNIVERSITY OF SEMEY

EDUCATIONAL PROGRAM

7M06 - Information and Communication Technologies
(Code and classifcation of the feld of education)

7M061 - Information and communication technologies
(Code and classifcation of the direction of training)

0610
(Code in the International Standard Classifcation of Education)

M094 - Information technology
(Code and classifcation of the educational program group)

7M06101 - Informatics
(Code and name of the educational program)

Master
(Level of preparation)

Semey

Educational program

7M06 - Information and Communication Technologies
(Code and classification of the field of education)

7M061 - Information and communication technologies
(Code and classification of the direction of training)

0610
(Code in the International Standard Classification of Education)

M094 - Information technology
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7M06101 - Informatics
(Code and name of the educational program)

Master
(Level of preparation)

Semey 2023

PREFACE

Developed

The educational program 7M06101 - Informatics in the direction of preparation 7M061 - Information and communication technologies on the basis of the State Compulsory Standards of Higher and Postgraduate Education approved by the Order of the Ministry of Science and Higher Education of the Republic of Kazakhstan dated July 20, 2022 No 2 (as amended by the order) was developed by the Academic Committee dated 20.02.2023 No 66).

Members of the Academic Committee	Full name	Academic degree, academic title, position	Signature
Head of the Academic Committee	Nurymkhan Gulnur	Dean of the Faculty of Engineering and Technology, c.t.s.	
Educational program manager	Karymsakova Indira	Acting Associate Professor of the Department "Automation, Information Technology and Urban Planning""	
Member of the AC	Kozhakhmetova Dinara	Head of the Department "Automation, Information Technology and Urban Planning""	
Member of the AC	Bekbayeva Roza	Acting Associate Professor of the Department "Automation, Information Technology and Urban Planning", Candidate of Technical Sciences	
Member of the AC	Bekenov Alisher	Director of IP "Title Agency"	
Member of the AC	Zenkovich Vladimir	Head of the Technical Department of the institution "Kazakh Network Information Center""	
Member of the AC	Lazarev Nurmuhamed	master s student of the MIF-201 group	
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Reviewing

Full name of the reviewer	Position, place of work	Signature
Kurmangalyeva Nurgul	Alikhan Bokeihan University, Head of the Department of Engineering and Technical Sciences	

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 No. 4/6 "10" April 2023
Chairman of the Quality Assurance Commission G.B. Abdilova.

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.

Content

1.Introduction

1.1.General data

The educational program "7M06101-Informatics", implemented by the Department of Automation, information technology and urban planning of the Faculty of Engineering and Technology of Semey Shakarim University, was developed taking into account the needs of the regional labor market, the requirements of regulatory documents of the Ministries of Science and Higher Education of the Republic of Kazakhstan and is a system of documents for the organization of the educational process. It reflects the features of the objectives of the educational training of masters with innovative thinking, possessing advanced technologies in the field of application of new information technologies in future professional activity, namely, consulting services in the field of information technology, in working with a wide class of applied software, repair and maintenance of computer equipment, installation of system and application software, and also designing and creating programs, databases, Internet sites, etc. The content of the educational program is implemented through a curriculum developed in a modular format, which provides two cycles of disciplines: a cycle of basic disciplines and a cycle of core disciplines, as well as additional types of training (practice, research work).

1.2.Completion criteria

The main criterion for the completion of the educational process for the preparation of masters of the scientific and pedagogical direction is the development of at least 88 credits of theoretical training, including 6 credits of pedagogical practice, 13 credits of research practice, as well as at least 24 credits of research work of a master`s student, including internships and the completion of a master`s thesis, at least 8 credits of the final attestations . A total of 120 credits.

1.3.Typical study duration: 2 years.

2.PASSPORT OF THE EDUCATIONAL PROGRAM

2.1.EP purpose	Training of competitive specialists with modern knowledge in the field of IT, including design, development, maintenance, automation of organizational management tasks and business processes
2.2.Map of the training profile within the educational program	
Code and classification of the field of education	7M06 - Information and Communication Technologies
Code and classification of the direction of training	7M061 - Information and communication technologies
Code in the International Standard Classification of Education	0610
Code and classification of the educational program group	M094 - Information technology
Code and name of the educational program	7M06101 - Informatics
2.3.Qualification characteristics of the graduate	
Degree awarded / qualification	Master of Technical Sciences under the educational programme 7M06101 - Informatics
Name of the profession / list of positions of a specialist	project manager, department head/department head, ICT auditor, teacher and researcher in higher education institutions and research institutes
OQF qualification level (industry qualification framework)	7
Area of professional activity	Activities in the field of computer programming, consulting services in the field of information technology, computer equipment management activities, research and teaching, other activities in the field of information technology and computer systems
Object of professional activity	Activities in the field of computer programming, consulting services in the field of information technology, computer equipment management activities, research and teaching, other activities in the field of information technology and computer systems
Types of professional activity	research and research, design and engineering, production and technological, educational.
Graduate Model	Graduate Model EP 7M06101 - "Computer Science" 1 Description of the OP The educational program 7M06101- "Computer Science" was developed by the qualification characteristics of the graduate. It reflects the features of the objectives of the educational training of masters with innovative thinking, possessing advanced technologies in the field of application of new information technologies in future professional activity, namely, consulting services in the field of information technology, in working with a wide class of applied software, repair and maintenance of computer equipment, installation of system and application software. The uniqueness of EP 7M06101 - "Computer Science" training of specialists in the field of computer programming with the skills of professional work in

	modern computer systems used in solving natural science problems. The graduate model of the educational program 7M06101 - " Computer Science " is developed on the basis of the following regulatory documents: 1. The Law of the Republic of Kazakhstan "On Education" No. 319-III dated July 27, 2007. 2. State Higher and Postgraduate Education No. 604 dated 20.07.2022. 3. Rules of organization of the educational process on credit technology of training Order of the Ministry of Education and Science of the Republic of Kazakhstan dated April 20, 2011 No. 152 4. Standard Rules for the activities of educational organizations implementing educational programs of higher education, Resolution No. 595 of the Government of the Republic of Kazakhstan dated October 30, 2018 5. Strategic plan of the NAO "Shakarim Semey University" for 2021-2025. 2 The purpose of the educational program – training of highly qualified personnel in demand in the labor market; – formation of systematized knowledge in the field of informatics and informatization of education; – formation of key and special competencies of masters with high social and civic responsibility, able to carry out professional activities; mastering the basics of research and experimental methods of observation and analysis of information processes and phenomena by undergraduates; formation of universal and socio-personal values in the context of scientific thinking and worldview. 3 Objectives of the educational program - To prepare masters with dedication, leadership, the ability to work in a team, carry out scientific research, apply modern methods of scientific and pedagogical direction in the field of information technology, responsible for the final result of their professional activities and the ability to self-improvement and self-development. - Acquire knowledge of key business processes and various methods of business support in infrastructure, information or organizational aspects. - 4 The results of the Master`s degree in EP 7M06101 - "Computer Science" (qualification level of the NRK)_7 in accordance with the Dublin descriptors of the second level suggest the ability: - demonstrate developing knowledge and understanding gained at the level of higher professional education, which are the basis or opportunity for the original development or application of ideas, often in the context of scientific research; - apply knowledge, understanding and the ability to solve problems in new or unfamiliar situations in contexts and within broader (or interdisciplinary) areas related to the field being studied;

	- integrate knowledge, cope with difficulties and make judgments based on incomplete or limited information, taking into account ethical and social responsibility for the application of these judgments and knowledge; - clearly and clearly communicate their conclusions and knowledge and their justification to specialists and non-specialists; - continue training independently. 4.1 Acquired competencies expressed in the achieved learning outcomes As a result of mastering this Master `s degree program , the graduate must have the following competencies: 1) general cultural competencies (OK): - the ability to improve and develop their general intellectual and general cultural level; - willingness to use knowledge of modern problems of science and education in solving educational and professional tasks; - the ability to independently master new research methods, to change the scientific profile of their professional activities ; - the ability to form resource and information bases for solving professional tasks; - the ability to independently acquire new knowledge and skills with the help of information technology and use them in practice, including in new areas of knowledge not directly related to the field of activity; - willingness to work with professional texts in a foreign language. 2) professional competencies: general professional: - willingness to carry out professional communication in the state, Russian and foreign languages; - the ability to carry out professional and personal self-education, to design a further educational route and professional career; - the use of a personality-oriented approach to ensure the possibility of self-disclosure and self-realization of students; application of various information technologies, creation of favorable conditions for self-education and professional orientation; □ implementation of professional, research, production activities in accordance with modern requirements. 4.2 Personal qualities of the graduate Personal qualities of a graduate that must be possessed in order to be a competitive specialist in the field of information technology: - Analytical skills: the ability to conduct a systematic analysis of information; systematize information; compare data; abstract information; design the result. - Diagnostic skills: the ability to structure the information received; to implement innovative and combinational processes related to the ability to predict.

	- Verbal and non-verbal skills: the ability to build business relationships with colleagues; establish cooperation with partners; formulate professional tasks; master oral and written speech. - Prognostic skills: confidence in one`s own actions in accordance with the assessment of everything that is happening; manifestation of extroversion and dominance as a condition of purposefulness, management, information modeling, energy mobilization, perseverance, activity, ability to withstand the load, perseverance when performing complex tasks. - Correctional skills: the ability to carry out self-analysis, self-correction; to determine the trajectories of self-development and self-education; to comprehend their own professional and personal capabilities.

3.Modules and content of the educational program

Sociolinguistic and scientific-pedagogical activity

Foreign language (professional)

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	25527 (3010634)
Course	1
Term	1
Credits count	3
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline

Mastery of general cultural, professional and special competencies for the implementation of professional activities, involving teaching free reading of original literature of the relevant branch of knowledge in a foreign language; development of oral communication skills in monological and dialogical form in the specialty; development of written scientific communication skills on topics related to the scientific work of a graduate student, as well as familiarization with the forms and types of international cooperation in the scientific field.

Purpose of studying of the discipline

The purpose of studying the discipline "Foreign language (professional)" in the master`s degree program is the systematic deepening of communicative competence within the framework of international standards of foreign language education on the basis of further development of skills and abilities of active language proficiency in the professional activity of the future master.

Learning Outcomes

ON1 Apply fundamental scientific, pedagogical, managerial, communicative knowledge and skills in professional activities.

Prerequisites

Bachelor

Postrequisites

Research work of the undergraduate, including the implementation of the masters thesis I

History and philosophy of science

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	25529 (3010636)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The discipline is aimed at studying the culture of scientific thinking, forms analytical capabilities and research skills, provides theoretical and practical knowledge necessary for a future scientist. Explores the historical evolution of the sciences and the philosophical perspectives they form. The origins of modern science, its social and institutional connections are described. General philosophical issues related to thought experiments, confirmation and refutation of theories, the origin and application of quantitative and high-quality research methods are considered.

Purpose of studying of the discipline

the formation of an interdisciplinary worldview among undergraduates, based on a deep understanding of the history and philosophy (theory) of scientific thinking, as part of a universal culture.

Learning Outcomes

ON1 Apply fundamental scientific, pedagogical, managerial, communicative knowledge and skills in professional activities.

Prerequisites

Bachelor

Postrequisites

Research work of the undergraduate, including the implementation of the masters thesis I

Tertiary education

Discipline cycle	Basic disciplines
Discipline component	University component

SubjectID	25530 (3010637)
Course	1
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
The course is aimed at studying the main directions, principles and patterns of higher education. During the course of the course, the basic concepts of modern pedagogy, concepts and theories of teaching and upbringing, didactics of higher education will be considered. The master`s student will master the skills of designing the organization of the educational process, techniques of individual and group reflection, will be able to correctly formulate pedagogical goals, apply educational technologies in the educational process. in the process, to design work programs of disciplines.

Purpose of studying of the discipline
The purpose of mastering the discipline is to master the system of knowledge about higher education, its content, structure, principles of educational process management and mastering modern technologies in the field of management and organization of the educational process

Learning Outcomes
ON1 Apply fundamental scientific, pedagogical, managerial, communicative knowledge and skills in professional activities.

Prerequisites
Bachelor

Postrequisites
Research work of the undergraduate, including the implementation of the masters thesis I

Psychology of management

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	25528 (3010635)
Course	1
Term	1
Credits count	3
Lections	15hours
Practical and seminar classes	15hours
Independent work of a student under the guidance of a teacher	20hours
Independent work of the student	40hours
Total	90hours
Knowledge control form	Examination

Short description of discipline
The content of the course is aimed at mastering the approaches and directions of management psychology, psychological laws of management, features of planning and solving management problems. Students will get acquainted with the psychological methods of resolving conflict situations, master the ways of motivating work, the methods of using effective management styles. Skills will be formed to analyze the psychological causes underlying the decline in the effectiveness of the management process.

Purpose of studying of the discipline
The purpose of the discipline "Psychology of Management" is the formation of scientifically based ideas about the system of mental phenomena, psychological variables of behavior and conscious human activity in modern conditions and allows undergraduates to form skills of applying the acquired psychological knowledge in educational activities

Learning Outcomes
ON1 Apply fundamental scientific, pedagogical, managerial, communicative knowledge and skills in professional activities.

Prerequisites
Bachelor

Postrequisites
Research work of the undergraduate, including the implementation of the masters thesis I

Teaching practicum

Discipline cycle	Basic disciplines
Discipline component	University component
SubjectID	25547 (3010633)
Course	2
Term	1
Credits count	6
Pedagogical practics	180hours
Total	180hours

Knowledge control form	Total mark on practice

Short description of discipline
The pedagogical practice of undergraduates consists in direct pedagogical activity: independent conducting of laboratory and practical classes, seminars, reading trial lectures on the proposed topic, preparing and conducting classes using modern educational technologies together with the teaching staff of the relevant department and solving current educational and methodological issues.

Purpose of studying of the discipline
The purpose of the practice is to deepen, improve and consolidate the acquired theoretical knowledge, the ability to apply them in teaching activities

Learning Outcomes
ON1 Apply fundamental scientific, pedagogical, managerial, communicative knowledge and skills in professional activities.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Software creation technologies

Web programming in PHP

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25540 (3010608)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline includes methods of designing Web sites, the use of graphics on Web pages, methods of processing and editing digital images, maintenance and placement of Web pages, software systems, server technologies, PHP, CSS, JavaScript, installing Apache Web server, working with it, creating MySQL databases, Web-websites, teaches the use of sound technologies and the preparation of technical tasks when creating Web sites, server administration, the use of Web site designers, the principles of working with them.

Purpose of studying of the discipline
Acquisition by students of knowledge about Web programming, mastering the capabilities of the PHP language for programming Web sites and Web interfaces to databases

Learning Outcomes
ON6 Master web programming methods, develop web applications.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis II

Artificial intelligence and decision theory

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	32100 (3022311)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the process of studying this discipline, master`s student study the concept of artificial intelligence, types of artificial intelligence. The course topics include Architecture and Design of artificial intelligence, Methods and Algorithms of artificial intelligence, Classification of AI Methods. Students will master the application of the theory of artificial intelligence in making managerial decisions, Intelligent decision support systems, Decision Theory. Decision-making modeling

Purpose of studying of the discipline
The purpose of studying the discipline is to master the concepts of artificial intelligence, types of artificial intelligence, architecture and design of artificial intelligence, methods and algorithms of artificial intelligence, classification of AI methods.

Learning Outcomes
ON4 Demonstrate proficiency in data mining and artificial intelligence methods, be able to apply these methods to solve practical problems.
Prerequisites
Bachelor
Postrequisites
Neural network technologies

Models of knowledge in information systems

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25551 (3010618)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline studies everything related to data and knowledge. Examines issues such as knowledge features, knowledge representation models, the creation of formal and informal models, network, logical, production and frame models. Functional networks. Methods of working with knowledge. Methods of acquiring knowledge. Methods of knowledge representation and processing. Methods of solving problems in knowledge-based systems. The structure of expert systems. Stages of development of expert systems.
Purpose of studying of the discipline
To form a system of competencies of the Master of Education in the field of information systems.
Learning Outcomes
ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Educational WEB-portals

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25550 (3010617)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The concept of web-technologies. The role of web-technologies in modern education. Functions, classification and current state of web browsers. Interaction between a web server and a browser. Toolkit for developing web-pages. Modern standards of the HTML language. Using CSS Cascading Style Sheets to design web pages, the principle of separation of form and content. Layout of web pages. Fundamentals of server and client scripting languages. Content management systems CMS.
Purpose of studying of the discipline
Mastering knowledge about the principles of functioning and basic technologies used in the creation and use of global information resources, as well as the skills of their effective use in the learning process and in further professional activities.
Learning Outcomes
ON6 Master web programming methods, develop web applications.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Tizen web application development

Discipline cycle	Basic disciplines

Discipline component	Electives
SubjectID	25541 (3010609)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is dedicated to learning the basics of programming in Java and gaining knowledge about the modern object-oriented Java programming language, mastering the basic programming techniques. Students study basic syntax, type system, compilation and launch of Java programs and language capabilities to gain skills in creating simple applications, developing console or window applications. Course topics include paradigm, OOP concepts, Java programming, file processing, exceptions, structures.

Purpose of studying of the discipline
The purpose of the course is to teach undergraduates to create mobile web applications running under the Tizen operating system.

Learning Outcomes
ON6 Master web programming methods, develop web applications.

Prerequisites
Software Development Technologies

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis II

Software Development Technologies

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	25531 (3010602)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the course of studying the discipline, students study object-oriented design and programming, abstraction, encapsulation, inheritance and polymorphism, methods and variables, type conversion, instanceof operator, overloading and overriding methods, constructors, access control, exception handling, use of standard templates, external libraries and frameworks, standard Java frameworks and owns the capabilities of libraries, the methodology of joint software development, implementation of a joint project.

Purpose of studying of the discipline
The purpose of the course is to teach students modern methodologies and technologies for developing software tools that allow them to develop complex software tools of high quality and significantly increase the productivity of a programmer.

Learning Outcomes
ON3 Demonstrate proficiency in the methodology of software design technology for solving professional tasks, use practical skills in software design and management.

Prerequisites
Bachelor

Postrequisites
Programming interfaces for computer systems

Corporate information systems in education

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25542 (3010610)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours

Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
This discipline includes the basic concepts and principles of building corporate information systems, general requirements, MES systems, ERP and ERP-II systems, MRP and MRP-II systems, business models, corporate governance and its resources, basic principles of enterprise automation, client-server architectures, existing corporate information systems, i.e. Microsoft Business Teaches the design of Solutions systems-Navision, TB, CRP, FRP, MPS, CRM,SCM and individual components and models of corporate information systems

Purpose of studying of the discipline
The purpose of the discipline is to develop an integrated approach for undergraduates in the formation of knowledge and skills in the field of integrated information systems in solving problems of economics and management, including an understanding of the main business processes of industrial enterprises, the role, tasks and capabilities of information technologies and systems in the modern infrastructure of companies, the features of the introduction and use of integrated information systems.

Learning Outcomes
ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis II

Research work of the undergraduate, including the implementation of the masters thesis I

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	25546 (3010638)
Course	1
Term	2
Credits count	11
The research work	330hours
Total	330hours
Knowledge control form	Total mark on practice

Short description of discipline
Undergraduate research work is a type of scientific activity that provides an opportunity to expand the knowledge gained at the postgraduate level for the initial development or application of ideas, often in the context of scientific research and practical skills for conducting scientific research.

Purpose of studying of the discipline
expand knowledge gained at the postgraduate level for the initial development or application of ideas, often in the context of scientific research and practical skills for conducting scientific research.

Learning Outcomes
ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.

Prerequisites
Basic and profile disciplines of the EP

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Neural network technologies

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	32102 (3022312)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the process of studying this discipline, undergraduates will master the concept of artificial neural network technologies, types of neural networks, tasks of neural networks, the principle of neural networks. The course topics include models and methods of neural network technologies, mathematical models of a neuron, artificial neuron circuits, multilayer neural networks. Undergraduates will master neural network training, the risks of neural network training, the scope of neural networks, the use of neural networks in creating optimal software development methodologies

Purpose of studying of the discipline
The purpose of studying the discipline is to master the concept of artificial neural network technologies, types of neural networks, tasks

of neural networks, principles of neural networks.

Learning Outcomes

ON4 Demonstrate proficiency in data mining and artificial intelligence methods, be able to apply these methods to solve practical problems.

Prerequisites

Bachelor

Postrequisites

Data mining

System of electronic evaluation of the level of competence

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25557 (3010627)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

In this discipline, the content of education, assessment of the quality of training of specialists, the object of assessment, its criteria, certification, integrative models of competence assessment, assessment of the level of IT competencies of students, innovative evaluation tools, project method, a number of improvements and examinations of evaluation tools, the method of developing cooperation, methods and criteria for assessing the competencies of students in electronic learning systems are studied .

Purpose of studying of the discipline

The study of theories, technologies and practices of didactic systems of electronic assessment of the level of competence.

Learning Outcomes

ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites

Software Development Technologies

Postrequisites

The research work of a student, including an internship and the implementation of a masters thesis III

Basic multimedia technology

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25538 (3010612)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The discipline studies primary information processing systems, the composition and structure of multimedia technologies, studies the basics of Internet technologies and ways to create multimedia electronic educational resources using specialized programs and web programming languages. Studies the use of multimedia resources in the educational process and ways to create multimedia interactive applications using the multi-paradigm programming language Java Script

Purpose of studying of the discipline

Development of pedagogical software tools, use of multimedia cabinet in teaching school subjects

Learning Outcomes

ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Methods of programming multimedia systems

Methods of programming multimedia systems

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25549 (3010616)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at obtaining theoretical knowledge and practical skills in the field of software and hardware organization of multimedia systems. Structure and organization of deployed multimedia applications, their application areas. Principles of construction of dynamic objects, their application: creation of educational multimedia manuals, manuals, training and information systems, virtual reality systems. The requirements for software and hardware for programming multimedia systems are also being studied.

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
ON7 Master the methods of programming multimedia systems, be able to apply these methods in practice.

Prerequisites
Software Development Technologies

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Object-oriented programming

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25524 (3010606)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the course of studying the discipline, students study object-oriented design and programming, abstraction, encapsulation, inheritance and polymorphism, methods and variables, type conversion, instanceof operator, overloading and overriding methods, constructors, access control, exception handling, use of standard templates, external libraries and frameworks, standard Java frameworks and owns the capabilities of libraries, the methodology of joint software development, implementation of a joint project.

Purpose of studying of the discipline
give a general idea of modern programming languages;
show different ways of writing operators that ensure the implementation of any algorithm (following, fork, repetition);
- to study the composition and structure of the Java programming language tools and its use in various fields of professional activity;
- learn the techniques and methods of creating forms using the Java programming language.

Learning Outcomes
ON7 Master the methods of programming multimedia systems, be able to apply these methods in practice.

Prerequisites
Bachelor

Postrequisites
Research work of the undergraduate, including the implementation of the masters thesis I

Estimation of the complexity of algorithms

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25526 (3010629)
Course	2
Term	1
Credits count	5
Lections	15hours

Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the concept of algorithm complexity, measuring and evaluating algorithm complexity, effective algorithms for solving problems and evaluating basic algorithms for sorting and searching information. Consideration of the types of functions of complex algorithms and the mathematical apparatus of algorithm analysis. The study of the calculation of the number of operations performed, the asymptotic notation used in the analysis of the growth rate and the comparison of the complexity of algorithms.

Purpose of studying of the discipline
the study of the dependence of the number of elementary operations performed by a computer on the amount of information processed.

Learning Outcomes
ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.

Prerequisites
Bachelor

Postrequisites
Research work of the undergraduate, including the implementation of the masters thesis I

Technology training Programming

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25539 (3010613)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline includes the study of the theoretical and practical part of software development technologies, principles of construction and design of software systems. Study and development of software tools and projects using multimedia tools for teaching based on an object-oriented programming language. Various methods of software layout and creation of services for both teaching and business are considered.

Purpose of studying of the discipline
Familiarization of students with fundamental algorithms of data processing, as well as with modern methods of algorithm research and evaluation of their algorithmic complexity

Learning Outcomes
ON7 Master the methods of programming multimedia systems, be able to apply these methods in practice.

Prerequisites
Software Development Technologies

Postrequisites
Research work of the undergraduate, including the implementation of the masters thesis I

Numerical Methods

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25522 (3010604)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the basic concepts and definitions of computational mathematics and methods of their solution. Such issues as solving nonlinear equations, approximation of functions, number error, numerical differentiation and integration, numerical methods for solving linear algebra and ordinary differential equations, Cauchy problems, boundary value problems using

specialized and integrated Matlab and Mathcad packages are considered.

Purpose of studying of the discipline

Using modern computer technology with the approximate and numerical analysis

Learning Outcomes

ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Programming interfaces for computer systems

Information technologies in enterprises

Mobile learning and virtual reality

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25525 (3010607)
Course	1
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

In the course of studying the discipline, students study modern developments and trends in the field of creating virtual and augmented reality applications, the capabilities of modern and promising virtual and augmented reality application development tools, the content of the stages of the virtual and augmented reality application development process, virtual and augmented reality application programming technologies, layers of software components that ensure the operation of virtual and augmented reality information systems reality, hardware and software components of user interfaces for visualization and management of virtual objects in immersive environments.

Purpose of studying of the discipline

establish a system of education master`s competences in the field of advanced learning technology solutions for professional activity pedagogical problems.

Learning Outcomes

ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

Research work of the undergraduate, including the implementation of the masters thesis I

Applied methods of analysis and processing of information in research

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25545 (3010628)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The discipline studies applied research methods - to ensure the focus of the process of studying the students of scientific methodology in the interest of determining the design, technology of the organization of research in the field of professional activity, Assessment and selection of methods of information acquisition and data processing and analysis, in particular, knowledge detection and the search for patterns in data. Acquisition of skills of data researcher and developer of mathematical models, methods and algorithms of data analysis

Purpose of studying of the discipline

The purpose of studying the discipline is to form a scientific understanding of applied statistical methods for the study of social phenomena

Learning Outcomes

ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

The research work of a student, including an internship and the implementation of a masters thesis II

Automation of scientific research

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25490 (3010614)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

The discipline studies the increase of efficiency and quality of scientific research on the basis of obtaining or clarifying with the help of automated systems of scientific research of mathematical models of objects under study. The automated research system is a software and hardware complex based on computer hardware, designed to conduct scientific research or complex tests of samples of new equipment on the basis of obtaining and using models of objects, phenomena and processes under investigation.

Purpose of studying of the discipline

The purpose of studying the discipline "Means of automation of research work" is to master the methods of planning and conducting research, to study the methods and means of automating their conduct and processing the results obtained, as well as the design of the results of scientific work.

Learning Outcomes

ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

The research work of a student, including an internship and the implementation of a masters thesis II

Means media, scientific visualization and virtual realities

Discipline cycle	Basic disciplines
Discipline component	Electives
SubjectID	25543 (3010615)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline

Formation of students` competences in accordance with the requirements of the GOS postgraduate education. Acquisition of knowledge by graduates taking into account professional standards, life cycle of project activity, rules of development of software products of the basics of personnel management, production, psychology of management, information security issues. Training of specialists who implement large-scale changes in the professional sphere and management of scientific processes. The course is studied within the framework of mediavizualism, a new direction of media research.

Purpose of studying of the discipline

The purpose of studying the discipline is to form an idea of various means of scientific research.

Learning Outcomes

ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.

Prerequisites

Basic and profile disciplines of the EP

Postrequisites

The research work of a student, including an internship and the implementation of a masters thesis II

Knowledge Engineering

Discipline cycle	Profiling discipline
Discipline component	Electives

SubjectID	25544 (3010626)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
Knowledge engineering as a scientific discipline covers specific scientific, technological and methodological problems of creating knowledge-based software systems within the framework of study. Expert systems belong to this class of systems.
The discipline is devoted to the study of the logical model of education, the network model, the production model, the use of fuzzy logic in knowledge-based systems, technology for the development of expert systems and expert systems.

Purpose of studying of the discipline
The purpose of the discipline is to develop a comprehensive approach in the formation of knowledge and skills in the field of application of Integrated Information Systems in solving the problems of Economics and management in undergraduates, which includes understanding the main business processes of industrial enterprises, the role, tasks and capabilities of Information Technologies and systems in the modern infrastructure of companies, the specifics of implementation and use of Integrated Information Systems.

Learning Outcomes
ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites
Artificial intelligence and decision theory

Postrequisites
Fundamentals of Blockchain Technologies

Fundamentals of Blockchain Technologies

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25486 (3010630)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline studies the basic concepts, models and mechanisms of blockchain technology, the fundamental concepts in the cryptocurrency economy. The concept of mining and analysis of blockchain technology and cryptocurrency mining. Bitcoin transactions and their verification. The latest cryptographic technologies used in blockchain technology. Ways to protect user accounts and ensure transaction security, as well as transaction accounting.

Purpose of studying of the discipline
The purpose of mastering the discipline "Fundamentals of Blockchain Technologies" is to gain knowledge from undergraduates about Blockchain technology, methods, means of using this technology, features of the technology, the scope of application of this technology. Prospects for the development of Blockchain technology in the future

Learning Outcomes
ON8 Have the skills to create databases and knowledge using modern software tools. Be able to create database objects in modern database management systems and manage access to these objects, acquire knowledge in the field of database management systems, the ability to include MySQL as a database server in multi-level applications. You will confidently master the tools and algorithms of working in the configurator and be able to put into practice the methods of creating and managing databases.

Prerequisites
Programming interfaces for computer systems

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Programming interfaces for computer systems

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25489 (3010625)
Course	1
Term	2

Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
As a result of studying this discipline, students study the relationship between a person and a computer, design and usability analysis of user interfaces, methods of quantitative and qualitative analysis and methods of their application through in-depth analysis of existing and creation of new interfaces, user interface design rules, stages, a set of developer tools, user interface testing and their design, modern tools and programming technologies of hardware software complexes, development of components of network applications.

Purpose of studying of the discipline
The purpose of the course is to teach methods of designing user interfaces, mastering the principles of organization and functioning of software and hardware interfaces in modern computer information systems.

Learning Outcomes
ON5 Describe the basic concepts of algorithmization and programming, demonstrate skills in developing effective algorithms in the interests of applied fields, demonstrate practical skills and abilities to create algorithms for solving problems and their programs.

Prerequisites
Software Development Technologies

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis II

Technologies of distributed databases

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25559 (3010632)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline studies the basic concepts of design and architecture of distributed databases, basic algorithms and distributed processing. Examines parallel, homogeneous, heterogeneous distributed systems, as well as the advantages and disadvantages of distributed databases. Studies the architecture of Microsoft SQL Server, database application design, automation of administrative tasks, query optimization and implementation of tasks requiring data access.

Purpose of studying of the discipline
The purpose of studying the discipline is to gain knowledge from undergraduates about distributed database technologies, methods, means of using these technologies, features of technologies, areas of application of these technologies. Prospects for the application of distributed database technology.

Learning Outcomes
ON8 Have the skills to create databases and knowledge using modern software tools. Be able to create database objects in modern database management systems and manage access to these objects, acquire knowledge in the field of database management systems, the ability to include MySQL as a database server in multi-level applications. You will confidently master the tools and algorithms of working in the configurator and be able to put into practice the methods of creating and managing databases.

Prerequisites
Programming interfaces for computer systems

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Technologies of structuring information resources

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25558 (3010631)
Course	1
Term	2
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours

Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at studying the basic concepts in the field of structuring and processing information, data mining. Studies such issues as the representation of various types of information in digitized form, as well as methods and algorithms for information compression. Examines the basic concepts, solved Data Mining tasks and data processing algorithms. Studies the integration of information resources and information retrieval technology.

Purpose of studying of the discipline
The purpose of mastering the discipline "Technologies of structuring information resources" is to gain knowledge from undergraduates about the technologies of structuring information resources, methods, means of using these technologies, features of technologies, areas of application of these technologies

Learning Outcomes
ON8 Have the skills to create databases and knowledge using modern software tools. Be able to create database objects in modern database management systems and manage access to these objects, acquire knowledge in the field of database management systems, the ability to include MySQL as a database server in multi-level applications. You will confidently master the tools and algorithms of working in the configurator and be able to put into practice the methods of creating and managing databases.

Prerequisites
Programming interfaces for computer systems

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Administration and designing of database in MS SQL Server

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25556 (3010624)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline examines the main aspects of managing a multi-user database of data management: database redesign procedures, parallel processing management, data backup and recovery, replication and navigation, automation of administrative functions in MS SQL Server, user and role management, basic database security measures, features of MS SQL Server, PostgreSQL and MongoDB DBMS management.

Purpose of studying of the discipline
-To master the technology of various work with databases.
- Familiarity with the basics of the .SQL language.
-Familiarity with the basic operations of databases.

Learning Outcomes
ON8 Have the skills to create databases and knowledge using modern software tools. Be able to create database objects in modern database management systems and manage access to these objects, acquire knowledge in the field of database management systems, the ability to include MySQL as a database server in multi-level applications. You will confidently master the tools and algorithms of working in the configurator and be able to put into practice the methods of creating and managing databases.

Prerequisites
Programming interfaces for computer systems

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Administration of the multiuser data bases

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25555 (3010623)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours

Knowledge control form	Examination

Short description of discipline
The discipline examines the main aspects of managing a multi-user database of data management: database redesign procedures, parallel processing management, data backup and recovery, replication and navigation, automation of administrative functions in MS SQL Server, user and role management, basic database security measures, features of MS SQL Server, PostgreSQL and MongoDB DBMS management.

Purpose of studying of the discipline
To consider the theoretical foundations of databases, to form skills and abilities for the effective solution of tasks of administration and data management in multi-user databases

Learning Outcomes
ON8 Have the skills to create databases and knowledge using modern software tools. Be able to create database objects in modern database management systems and manage access to these objects, acquire knowledge in the field of database management systems, the ability to include MySQL as a database server in multi-level applications. You will confidently master the tools and algorithms of working in the configurator and be able to put into practice the methods of creating and managing databases.

Prerequisites
Programming interfaces for computer systems

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Data mining

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	32103 (3022313)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the process of studying this discipline, the main methods and tools of DM are considered. Course topics include: The evolution of ICT and the potential of data mining, DM in business, and HELL in solving complex applied problems, Main tasks and classification of data analysis methods, Basic methods of data analysis and interpretation, High-performance data processing. Undergraduates will learn how to work with DATA MINING tools.

Purpose of studying of the discipline
The purpose of studying the discipline is the development of IAD in solving complex applied problems, the main tasks and classification of data analysis methods, the main methods of data analysis and interpretation, high-performance data processing.

Learning Outcomes
ON4 Demonstrate proficiency in data mining and artificial intelligence methods, be able to apply these methods to solve practical problems.

Prerequisites
Neural network technologies

Postrequisites
Final examination

The use of cloud computing

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25553 (3010620)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline studies the history of the development of "cloud computing", deployment architecture, cloud services and Azure Pack, the possibilities of using virtual technologies and platforms, analysis of existing cloud services and ways to connect to them. Examines the economics of cloud computing, the advantages and disadvantages of using cloud services, the migration of "oblak" and the main directions of development. Examines the issues of scaling, deployment, security of use and privacy.

Purpose of studying of the discipline
To provide undergraduates with the opportunity to gain knowledge and practical experience in the field of current cloud computing technologies.
Learning Outcomes
ON9 Get theoretical knowledge and practical skills on the architecture of "cloud" technologies, methods and features of designing "cloud" services, developing applications for the main existing "cloud" platforms.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

The research work of a student, including an internship and the implementation of a masters thesis II

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	25548 (3010600)
Course	2
Term	1
Credits count	4
The research work	120hours
Total	120hours
Knowledge control form	Total mark on practice

Short description of discipline
Research work of a master`s student is a type of scientific activity that makes it possible to expand knowledge, obtained at postgraduate level, for the initial development or application of ideas, often in the context scientific research and practical skills in conducting scientific research.
Purpose of studying of the discipline
Systematization of theoretical knowledge, development of skills in setting tasks on the topic of research and their consistent solution
Learning Outcomes
ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Cloud computing

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25485 (3010621)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline is aimed at obtaining general information and characteristics about cloud computing, architecture and the main models of cloud technologies, methods and tools for designing "cloud" services. Examines the existing cloud technology platforms, the advantages and risks associated with the use of "cloud computing", as well as the prerequisites for the transition to "cloud" infrastructure for the use of "cloud" services. Studies application development technologies for the main existing "cloud" platforms.
Purpose of studying of the discipline
The purpose of mastering the discipline "Cloud Computing" is to obtain general information about cloud computing as one of the main trends in information technology, the prerequisites for its development, the main models of cloud technologies necessary for a graduate who has mastered a master`s degree program to solve various tasks of practical, research and teaching activities
Learning Outcomes
ON9 Get theoretical knowledge and practical skills on the architecture of "cloud" technologies, methods and features of designing "cloud" services, developing applications for the main existing "cloud" platforms.
Prerequisites
Software Development Technologies
Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Cloudy technologies

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	25552 (3010619)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
The discipline studies issues in the field of server and cloud technologies, basic models of cloud computing and cloud solutions, virtualization technology, Windows Azure Queue architecture and Azure Blob Services. Studies Amazon, VMware Cloud, Azure Services Platform platforms and practical mastering of Microsoft Word Web App and Microsoft Excel Web App cloud services.

Purpose of studying of the discipline
Formation of undergraduates` knowledge in the field of cloud technologies

Learning Outcomes
ON9 Get theoretical knowledge and practical skills on the architecture of "cloud" technologies, methods and features of designing "cloud" services, developing applications for the main existing "cloud" platforms.

Prerequisites
Software Development Technologies

Postrequisites
The research work of a student, including an internship and the implementation of a masters thesis III

Robotics

Discipline cycle	Profiling discipline
Discipline component	Electives
SubjectID	32099 (3022314)
Course	2
Term	1
Credits count	5
Lections	15hours
Practical and seminar classes	30hours
Independent work of a student under the guidance of a teacher	35hours
Independent work of the student	70hours
Total	150hours
Knowledge control form	Examination

Short description of discipline
In the process of studying this discipline, undergraduates will master the concept of a manipulator, a robot, technical characteristics of robots, structural and kinematic classification of manipulators of robotic systems. The course topics include coordinate transformations in robotic systems, determining the position of coordinates of points, a direct kinematics problem. Undergraduates will learn how to solve the direct kinematics problem and determine the speeds of the manipulator drive points, the inverse kinematics problem

Purpose of studying of the discipline
The purpose of studying the discipline is to master the concepts of a manipulator, a robot, technical characteristics of robots, structural and kinematic classifications of manipulators of robotic systems.

Learning Outcomes
ON10 Demonstrate knowledge in the field of robotics, develop programs for robotic complexes.

Prerequisites
Neural network technologies

Postrequisites
Final examination

Practice research

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	25560 (3010599)
Course	2
Term	2
Credits count	13
Working practice	390hours
Total	390hours
Knowledge control form	Total mark on practice

Short description of discipline
Research practice, which contributes to the acquisition and consolidation of theoretical knowledge of undergraduates obtained during training, acquisition of professional skills, deepening and consolidation of knowledge and competencies acquired in the process of theoretical training.
Purpose of studying of the discipline
integrate knowledge gained within different disciplines to solve research problems in new unfamiliar conditions
Learning Outcomes
ON3 Demonstrate proficiency in the methodology of software design technology for solving professional tasks, use practical skills in software design and management.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

The research work of a student, including an internship and the implementation of a masters thesis III

Discipline cycle	Profiling discipline
Discipline component	University component
SubjectID	25561 (3010601)
Course	2
Term	2
Credits count	9
The research work	270hours
Total	270hours
Knowledge control form	Total mark on practice

Short description of discipline
Research work of a master`s student is a type of scientific activity that makes it possible to expand knowledge, obtained at postgraduate level, for the initial development or application of ideas, often in the context
scientific research and practical skills in conducting scientific research.
Purpose of studying of the discipline
The purpose of the master`s research work is
to ensure the ability to independently carry out research work related to solving professional problems
in the field of information technology, the main result of which will be the writing and successful defense of the final qualifying work
Learning Outcomes
ON2 To solve problems arising in the course of research activities and requiring in-depth professional knowledge.
Prerequisites
Basic and profile disciplines of the EP
Postrequisites
Final examination

Final certification

Master`s dissertation

Credits count	8

4.Summary table on the scope of the educational program

«7M06101 - Informatics»

Name of discipline	Cycle/ Component	Term	Number of credits	Total hours	Lec	SPL	LC	IWST	IWS	Knowledge control form
Sociolinguistic and scientific-pedagogical activity										
Foreign language (professional)	BS/US	1	3	90		30		20	40	Examination
History and philosophy of science	BS/US	1	5	150	15	30		35	70	Examination
Tertiary education	BS/US	1	3	90	15	15		20	40	Examination
Psychology of management	BS/US	1	3	90	15	15		20	40	Examination
Teaching practicum	BS/US	3	6	180						Total mark on practice
Software creation technologies										
Web programming in PHP	BS/CCh	1	5	150	15	30		35	70	Examination
Artificial intelligence and decision theory	BS/CCh	1	5	150	15	30		35	70	Examination
Models of knowledge in information systems	BS/CCh	1	5	150	15	30		35	70	Examination
Educational WEB-portals	BS/CCh	1	5	150	15	30		35	70	Examination
Tizen web application development	BS/CCh	1	5	150	15	30		35	70	Examination
Software Development Technologies	AS/US	1	5	150	15	30		35	70	Examination
Corporate information systems in education	AS/CCh	2	5	150	15	30		35	70	Examination
Research work of the undergraduate, including the implementation of the masters thesis I	AS/US	2	11	330						Total mark on practice
Neural network technologies	AS/CCh	2	5	150	15	30		35	70	Examination
System of electronic evaluation of the level of competence	AS/CCh	2	5	150	15	30		35	70	Examination
Basic multimedia technology	AS/CCh	2	5	150	15	30		35	70	Examination
Methods of programming multimedia systems	AS/CCh	3	5	150	15	30		35	70	Examination
Object-oriented programming	AS/CCh	3	5	150	15	30		35	70	Examination
Estimation of the complexity of algorithms	AS/CCh	3	5	150	15	30		35	70	Examination
Technology training Programming	AS/CCh	3	5	150	15	30		35	70	Examination
Numerical Methods	AS/CCh	3	5	150	15	30		35	70	Examination
Information technologies in enterprises										
Mobile learning and virtual reality	BS/CCh	1	5	150	15	30		35	70	Examination
Applied methods of analysis and processing of information in research	BS/CCh	2	5	150	15	30		35	70	Examination
Automation of scientific research	BS/CCh	2	5	150	15	30		35	70	Examination

Means media, scientific visualization and virtual realities	BS/CCh	2	5	150	15	30		35	70	Examination
Knowledge Engineering	AS/CCh	2	5	150	15	30		35	70	Examination
Fundamentals of Blockchain Technologies	AS/CCh	2	5	150	15	30		35	70	Examination
Programming interfaces for computer systems	AS/CCh	2	5	150	15	30		35	70	Examination
Technologies of distributed databases	AS/CCh	2	5	150	15	30		35	70	Examination
Technologies of structuring information resources	AS/CCh	2	5	150	15	30		35	70	Examination
Administration and designing of database in MS SQL Server	AS/CCh	3	5	150	15	30		35	70	Examination
Administration of the multiuser data bases	AS/CCh	3	5	150	15	30		35	70	Examination
Data mining	AS/CCh	3	5	150	15	30		35	70	Examination
The use of cloud computing	AS/CCh	3	5	150	15	30		35	70	Examination
The research work of a student, including an internship and the implementation of a masters thesis II	AS/US	3	4	120						Total mark on practice
Cloud computing	AS/CCh	3	5	150	15	30		35	70	Examination
Cloudy technologies	AS/CCh	3	5	150	15	30		35	70	Examination
Robotics	AS/CCh	3	5	150	15	30		35	70	Examination
Practice research	AS/US	4	13	390						Total mark on practice
The research work of a student, including an internship and the implementation of a masters thesis III	AS/US	4	9	270						Total mark on practice
Final certification										
Master`s dissertation		4	8	240						