"Kazakh National Research Technical University after K. I. Satpayev"
Institute of Cybernetics and Information Technology
The department of "Cybersecurity, processing and storage of information"

Educational program
CURRICULUM PROGRAM

7M06103 - «Management information systems»
(Scientific and pedagogical direction, 2 years)

Master of Technical Sciences

1st Edition
in accordance with the Higher Education 2018 SES

Almaty 2020

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The program is drawn up and signed by the parties:
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2 Almaty University of Energy and Communications
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    Approved at the meeting of Educational and Methodological Council of Kazakh
National Research Technical University after K. I. Satpayev. The protocol №3 from
15.12.2020.

1. Requirements to the level of training of students

Qualifications and competences

In accordance with the National Qualifications Framework (NQF) Approval of the minutes from the March 16, 2016 the Republican tripartite commission on social partnership and regulation of social and labor relations

Graduate - graduate education, educational programs that focus on training with the award of the degree of "Master" in the relevant specialty. This educational program (EP) aims to prepare graduate students for information systems.

National Qualifications Framework has eight skill levels, which corresponds to the European Qualifications Framework and the levels of education as defined by the Law of the Republic of Kazakhstan dated July 27, 2007 "On education". Eight recommended levels are described in the form of learning outcomes. The document contained general requirements for the qualification of undergraduates, who for experts in the field of information systems are described below.

Qualifications for NRC:
This educational program is at the 7 level of a national qualifications framework.

The professional competence of the NRK:
The knowledge gained after the completion of the educational program should provide a conceptual level in the field of information systems and technologies to generate new applied knowledge of the subject area.

Skills and abilities should ensure autonomy in determining the purpose of professional activities and the selection of appropriate methods and means to achieve them, including a student innovation in the field of information systems and technologies.

Personal and professional competence a student must be appropriate for the adoption of the strategy division of activities, as well as in decision-making and accountability at the departmental level, related to information systems and technologies.

Ways to achieve specified qualifications should be determined by an active professional position of a student, based on his professional knowledge and skills in the field of information systems, its creativity and the development of knowledge and skills of the art, including training Master's and / or practical experience.

The branch frame qualifications (ORK) Information and communication technologies, developed on the basis of the national qualifications framework, is the basic document for the development of educational programs for the training of specialists in the field of information systems and technologies. This JWC approved minutes of the meeting Industry Commission in the sphere of information, informatization, communication and telecommunication of December 20, 2016 number 1.

Basic regulations within which the professional activity of the ICT industry:

1) Decree of the President of the Republic of Kazakhstan from February 1, 2010 № 922 "On the Strategic Development Plan of Kazakhstan till 2020";

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2) The Law of the Republic of Kazakhstan "On informatization" of November 24, 2015goda № 418-V SAM;

3) Law of the Republic of Kazakhstan "On Telecommunications" dated July 5, 2004 № 567;

4) Law of the Republic of Kazakhstan dated January 7, 2003 № 370 "On electronic document and electronic digital signature";

5) of the Republic of Kazakhstan President's Decree of January 8, 2013 № 464 "On State Program" Information Kazakhstan - 2020 "and the introduction of amendments in the Republic of Kazakhstan President's Decree of March 19, 2010 № 957" On approval of the list of state programs ";

6) Resolution of the Republic of Kazakhstan dated June 16, 2016 № 353 "Some questions of the Ministry of Information and Communications of the Republic of Kazakhstan."

7) State compulsory education standard for all levels of education, order No. 604 dated 31.10.2018 and No. 182 dated 05.05.2020.

According to the Law of the Republic of Kazakhstan "On informatization" of 24th of November 2015 number 18 VZRK, industry and communication technology (ICT) is defined as the branch of the economy associated with the design, production and sale of software, hardware, consumer electronics and its components, as well as provision of information and communication services.

In accordance with the general classification of economic activities of the Republic of Kazakhstan (NCEA), a professional group of ICT industry, pertaining to information systems and technology, include the following economic activities:

1) ICT Manufacturing:

− 58 Publishing:
- 58.2 Software publishing *
- 58.21 The creation of computer games
- 58.29 Edition Other software

2) ICT services:

− 61 Communication;
- 61.1 Wired telecommunications activities
- 61.2 Wireless telecommunications activities
- 61.9 Other telecommunications activities

- 62 Computer programming, consultancy and related services
- 62.01 The activities in the field of computer programming
- 62.02 Consultancy services in Information Technology
- 62.03 The activities Computer facilities management
- 62.09 Other activities in the field of information technology and computer systems

− 63 Information service activities;
- 63.1 Accommodation services and processing of data; Web portals
- 63.11 Data processing, hosting and other services
- 63.12 Web portals

−70 Activities of head offices; advice on the

management;

- 70.2 activities Management consultancy

− 71 Activity in the architecture, engineering studies, technical testing and analysis;

- 71.1 Activity in architecture and engineering activities and related technical consultancy (information systems and technologies).

− 77 Rent, rental and leasing;

- 77.3 Rental and lease of other machinery, equipment and tangible goods (for information systems to use Internet services providers and cloud computing)

− 95 Repair of computers and personal and household goods (for information systems professionals in their capabilities).

- 95.1 Repair of computers and communication equipment
- 95.11 Repair of computers and peripheral equipment

According to the 7 level NRC competencies and URC define the professional competence in the sector of information and communication technologies required for specialists in information systems and technologies.

The professional competence of the ORK:

Knowledge the life cycle of the project activities in the field of information systems, the rules of software development, the company's core business processes, personnel management, production, management, psychology of management and information security issues. Knowledge of methodology concepts, strategies, models of functional activity and interaction, ways of setting and system solutions and challenges with the use of advanced scientific approaches, enabling enterprises to achieve development through information technology.

Skills and abilities. Ability to integrate knowledge, deal with the complexities and make judgments based on incomplete or limited information, taking into account the responsibility of the application of these judgments and knowledge. It demonstrates the company's competitiveness analysis skills, considering the trend of the IT market. The ability to recognize changes in the business environment and to determine the strategic direction of the unit and / or enterprise. Implementation of large-scale changes in the sphere of information technologies and systems, as well as management of scientific processes.

Personal and professional competence. Independence:

management (installation and commissioning, production and technology) activities,

supposing the creation of the strategy of functioning and development of the enterprise, organization and conditions responsible for the production and sale of individual parts, components, assemblies and equipment. Responsibility: responsible for defining strategy, process management

and activities (including innovation) businesses. The complexity of the analysis and development of solutions to improve the process, the development of new approaches, using a variety of methods.

Ways to achieve. Higher education, practical experience. Postgraduate education experience.

2. Requirements for the content of education

The aim of postgraduate education is to prepare, taking into account the prospects

competitive development of highly qualified personnel with high spiritual and moral qualities, capable of independent thinking and providing a progressive science and technology, socio-economic and cultural development of society.

In the post-formation in content as determined according to the basic values SES RK:

1) Kazakhstan patriotism and civic responsibility;

2) respect;

3) cooperation;

4) open.

Requirements to key competences of graduates in scientific and pedagogical master degree according to the SES must RK:

1) to have an idea:

- the role of science and education in the social life;

- on current trends in the development of scientific knowledge;

- about actual methodological and philosophical problems of natural (social, humanitarian, economic) sciences;

- on the professional competence of the teacher of the higher school;

- the contradictions and the socio-economic impacts of globalization;

2) to know:

- methodology of scientific knowledge;

- principles and structure of the organization of scientific activity;

- psychology of cognitive activity of undergraduates in the learning process;

- psychological methods and means to improve the efficiency and quality of education;

3) be able to:

- use this knowledge to the development and application of original ideas in the context of research;

- to critically analyze existing concepts, theories and approaches to the analysis of processes and phenomena;

- integrate the knowledge gained within different disciplines to solve research tasks in new unfamiliar conditions;

- by integrating the knowledge to make judgments and decisions based on incomplete or limited information;

- apply knowledge of pedagogy and psychology of higher education in their teaching activities;

- use interactive teaching methods;

- conduct information-analytical and information and bibliographic work with attraction of modern information technologies;

- creative thinking and creative approach to solving new problems and situations;

- be fluent in a foreign language at a professional level, allowing to carry out research and to implement the teaching of special disciplines in the universities;

- summarize the results of research and analysis in the form of theses, scientific articles, reports, analytical notes, etc .;

4) have the skills to:

- research activity, solution of standard scientific tasks;
- implementation of educational and pedagogical activity on credit technology;
- methods of teaching vocational subjects;
- use of modern information technologies in educational process;
- professional communication and cross-cultural communication;
- oratory, correct and logical registration of the thoughts orally and in writing;
- broadening and deepening the knowledge necessary for daily professional activities and continuing education in doctoral studies;

5) be competent:
- in the field of research methodology;
- in the field of scientific and pedagogical activity in higher education institutions;
- in matters of modern educational technologies;
- in carrying out research projects and studies in the professional field;
- to how to ensure continuous updating of knowledge and the expansion of professional skills and abilities.

Requirements for the research work of a student:

Research work in a scientific and pedagogical magistracy should:

1) correspond to the basic problems of specialty, which is protected by Master's thesis;

2) to be relevant, contain scientific novelty and practical importance;

3) based on modern theoretical, methodological and technological achievements of science and practice;

4) performed using modern methods of scientific research;

5) comprise research (methodical, practical) sections of the main protective position;

6) based on international best practice in the relevant field of expertise.

to logistical requirements:

University that implements educational graduate programs should have the material and technical base (classroom fund, computer rooms, laboratories, instrumentation, stock materials), corresponding to the current sanitation rules and to ensure that all kinds of theoretical and practical training, provided by the curriculum and the effective implementation of scientific research and experimental and research work of a student.

to the training and methodological support requirements:

1) educational methods and information support of the educational process should guarantee the possibility of a qualitative development of graduate education graduate programs;

2) an educational program should provide free access to international information networks, electronic databases, library collections, computer technologies, educational and methodical and scientific literature;

3) the library fund and provision of educational literature on electronic and magnetic media must comply with the requirements for licensing of educational activities.

the organization of practical requirements:

educational program of scientific and pedagogical magistracy includes two types of

1) teaching - education organization;

2) research - at the place of performance of the thesis.

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Teaching practice is conducted for the purpose of formation of practical skills and teaching methods.

Pedagogical practice can be carried out in the period of theoretical training on the job training process. At the same time undergraduates are involved in conducting studies in a bachelor degree.

Research practice undergraduates held to familiarize with the latest theoretical, methodological and technological achievements of domestic and foreign science, modern methods of scientific research, processing and interpretation of experimental data.

Requirements to staffing of the university defined qualification

Requirements for licensing of educational activity.

2 Passport of the educational program

Education Master's program is structured on the principle of modular training. Structure educational master program is formed of various kinds of academic and scientific work defining education content.

Education Master's program includes:

1) theoretical studies, including the study of basic and majors cycles;

2) practical training for undergraduates: a different kind of practice, professional training;

3) research project, including the implementation of the Master

thesis - for scientific and pedagogical magistracy;

4) the intermediate and the final certification.

1 Brief description of the program:

Objectives: The main purpose of the educational program is to train highly - qualified specialists in all spheres of the national economy of Kazakhstan and the public sector, including businesses and organizations large (corporate), medium and small businesses, which have a need for solving the resulting problem, storage, processing, analysis, presentation and transmitting information using modern information and communication technology. The educational program also aims to prepare teaching staff for higher education.

Types of work: According to the Classification of Occupations Tax Code of RK 01-2017, paragraph 133 graduates of this specialty may hold positions as managers (control) units of information and communication technologies and information as well as high school teachers. Graduate students who successfully complete the course can work in the following specialties:

- Project Manager;
- Head of the project portfolio;
- ICT auditor;
- Analyst response incidents of information security;
- Viral analyst;
- Auditor web vulnerabilities;
- teachers in higher education.

Objects of professional activity: The effectiveness of any organization today is determined by its information and communication processes. The objective of a student is involved in the creation, operation and development of the organization's information system, which will provide high efficiency of these processes. Another objective is to participate in the educational process of higher education.

The scope and content of the program: Duration of study in the master degree determined by the volume of assimilated academic credit. During the development of a set volume of academic credits and achievement of the expected learning outcomes for the master's degree graduate education program is considered to be fully mastered

Planning of educational content, method and organization of educational process is carried institution of higher education and scientific organization independently on the basis of credit technology.

Master's core area implements educational programs of postgraduate education in the training of managerial personnel with in-depth training.

Education Master's program includes:

1) The theoretical training including learning base (DB) and majors cycles (PD);

2) practical training for undergraduates: a different kind of practice (teaching and research), professional training;

3) research work undergraduates (NIRM), including implementation of the master's thesis - for scientific and pedagogical magistracy;

4) the intermediate and the final certification (IA).

Working curriculum (RUE) should correspond competence and qualifications described in Section 1, and the volume and content described in Table 1.

The content of the educational program must correspond to the above-described goals and competences defined in relevant documents, NRC, ORK, GOSORK. [1-3] In accordance with SES RK educational program content determined standard curriculum (tuples) and working curriculum (RUP). model curriculum template shown in Annex 1.RUP compiled for one academic year on the basis of tuples. RUP for the current school year with an academic load description is presented in Appendix 2. Description of disciplines of the educational program presented in Annex 3.

2. Requirements for applicants

BACKGROUND formation applicants - higher professional education (undergraduate). The applicant must have a diploma, a standard form and confirm the level of English language proficiency certificate or certificates of the established sample.

The order of reception of citizens in magistracy is established in accordance "Typical rules of admission to educational organizations that implement education programs of postgraduate education."

Formation of a contingent master's degree, is carried out by placing the state educational order for the training of scientific and teaching staff, as well as tuition at their own expense of citizens and other sources. Citizens of the Republic of Kazakhstan State ensures the provision of the right to receive on a competitive basis in accordance with the state educational order free post-graduate education, if education at this level for the first time they get.

On the "input" master student must have all the prerequisites needed for the development of appropriate educational graduate programs. The list of necessary prerequisites determined by higher education institution independently.

In the absence of the necessary prerequisites undergraduates allowed them to learn on a fee basis.

3. Requirements for the completion of training and a diploma

Upon completion of training a graduate must meet the qualifications and expertise relevant to the NRC, JWC and SES RK described in section 1.

The final result of research or an experimental

research work of a student is a master's thesis (Master's project). The main results of the master's thesis must be masters of scientific and pedagogical magistracy not less than two publications in scientific journals and / or materials of the scientific-practical (scientific theoretical) conference.

Requirements for the content and design of the master's thesis (Master's project), their preparation and protection are determined by the university itself.

Master's thesis must necessarily be tested for

plagiarism, rules and procedures of which are determined by higher education institution independently.

awarded academic degree/ Qualifications: Graduates of this educational program is assigned to the degree of "Master of Engineering" by the scientific and pedagogical direction.

4 Working curriculum of the educational program

Education program: 7M06103- **«Management of information systems»**

Form of study: daytime
Duration of training: 2 years
Academic degree: Master of Engineering Science

year of study	Code	Name of course	Component	ECTS	ME	lecture/ laboratory/ practice/ IWS	Prerequisites	Code	Name of course	Component	ECTS	ME	lecture/ laboratory/ practice/ IWS	Prerequisites
1		**1 semester**							**2 semester**					
	HUM 201	History and philosophy of science	BD IC	4	2	1/0/1/2		LNG2 02	Foreign language (professional)	BD IC	6	3	0/0/3/3	
	HUM 207	Higher school pedagogy	BD IC	4	2	1/0/1/2			Elective	PS CC	6	3		
		Elective	PS CC	6	3				Elective	PS CC	6	3		
		Elective	BD CC	6	3			HUM 204	Management psychology	BD IC	4	2	1/0/1/2	
	AAP 242	Master's student scientific research, including an internship and a master's thesis	MSSR	6					Elective	BD CC	6			
									Elective	BD CC	6			
								AAP2 44	Pedagogical practice	BD IC	6			
								AAP 242	Master's student scientific research, including an internship and a master's thesis	MSSR	6			
		In total		**26**					**In total**		**46**			
2		**3 semester**							**4 semester**					
		Elective	PS CC	6	3	2/1/0/3		AAP2 42	Master's student scientific research, including an internship and a master's thesis	MSSR	6			
		Elective	PS CC	6	3			AAP2 43	Research scientific training	PS	7			
		Elective	PS CC	6	3			ECA2 05	Registration and defense of the master's thesis (RaDMT)	FA	12			
		Elective	PS CC	6	3									
	AAP 242	Master's student scientific research, including an	MSSR	6										

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		internship and a master's thesis											
		In total		**30**					**In total**		**25**		
									In all		**125**		

ELECTIVE DISCIPLINE CATALOG
Educational program
Education program: 7M06103- «Management of information systems»

BD Choice component - 18 credits					
	Code	**Name of disciplines**	**Credits**	**Lec/lab/prac/IWS**	**Semester**
	CSE139	Design of information systems	6	1/1/1/3	1
	CSE250	Infrastructure Information Systems	6	2/0/1/3	1
	SEC241	Database development in Microsoft SQL Server environment	6	2/0/1/3	2
	SEC221	Means of security of network of operating systems	6	2/0/1/3	2
	SEC226	Statistical analysis	6	1/0/2/3	2
	CSE249	Model-Driven Software Engineering	6	2/1/0/3	2
		Total	**18**		
PS CC **Choice component - 66 credits**					
	CSE202	Analysis, modeling and design of information systems	6	1/0/2/3	1
	SEC210	Methods of cryptology and means of information protection	6	2/1/0/3	1
	CSE714	Data Management in Information Systems	6	1/1/1/3	2
	GEN200	Analysis, modeling and design of information systems	6	2/0/1/3	2
	SEC242	Geographic information systems	6	1/1/1/3	2
	CSE746	Machine Learning & Deep Learning	6	2/0/1/3	3
	CSE219	Theory and practice of statistics	6	2/0/1/3	3
	CSE125	Management of IS	6	2/1/0/3	3
	SEC243	Intellectual methods of data processing	6	1/0/2/3	3
	SEC246	Big Data and Data Analysis	6	2/1/0/3	3
	CSE239	Multiagent Systems	6	2/1/0/3	3
		Total	**36**		

MODULAR CURRICULUM

Education program: 7M06103- «Management of information systems»

Form of study: daytime
Duration of training: 2 years
Academic degree: Master of Engineering Science

The cycle	code	Name of disciplines	Semester	Acad. credits	lec.	lab.	prac	IWS	Type of control	Chair
Profile training module
Basic disciplines (BD) (40 credits)
University component
BD	HUM201	History and philosophy of science	1	4	1	0	1	2	Exam	SD
BD	HUM207	Higher school pedagogy	1	4	1	0	1	2	Exam	SD
BD	LNG202	Foreign language (professional)	2	6	0	0	3	3	Exam	EL
BD	HUM204	Management psychology	2	4	1	0	1	2	Exam	SECPM
Practice-oriented module
BD	AAP244	Pedagogical practice	2	4	0	0	2	2	Report	
Choice component
Research, Analysis and Data Modeling Module
BD	CSE139	Design of information systems	1	6	1	1	1	3	Exam	CIPaS
BD	CSE250	Infrastructure Information Systems	1	6	2	0	1	3	Exam	CIPaS
BD	SEC241	Database development in Microsoft SQL Server environment	2	6	2	0	1	3	Exam	CIPaS
BD	SEC221	Means of security of network of operating systems	2	6	2	0	1	3	Exam	CIPaS
BD	SEC226	Statistical analysis	2	6	1	0	2	3	Exam	CIPaS
BD	CSE249	Model-Driven Software Engineering	2	6	2	0	1	3	Exam	CIPaS
Major disciplines (MD) (49 credits)
Choice component (CC)
Control and data processing module in IS
MD	CSE202	Analysis, modeling and design of information systems	1	6	1	0	2	3	Exam	CIPaS
MD	SEC210	Methods of cryptology and means of information protection	1	6	2	1	0	3	Exam	CIPaS
MD	CSE714	Data Management in Information Systems	2	6	2	0	1	3	Exam	CIPaS
MD	GEN200	Analysis, modeling and design of information systems	2	6	1	1	1	3	Exam	AMaEG
MD	SEC242	Geographic information systems	2	6	1	1	1	3	Exam	CIPaS
MD	CSE746	Machine Learning & Deep Learning	3	6	2	0	1	3	Exam	SE
MD	CSE219	Theory and practice of statistics	3	6	2	0	1	3	Exam	CIPaS
MD	CSE125	Management of IS	3	6	2	1	0	3	Exam	CIPaS
MD	SEC243	Intellectual methods of data processing	3	6	1	0	2	3	Exam	CIPaS
MD	SEC246	Big Data and Data Analysis	3	6	2	1	0	3	Exam	CIPaS
MD	CSE239	Multiagent Systems	3	6	1	0	2	3	Exam	SE

		Practice-oriented module									
MD	AAP236	Research practice	4	7					Report	
		Research Module (24 credits)									
MSSR	AAP242	Master's student scientific research	1	6					Report	
MSSR	AAP242	Master's student scientific research	2	6					Report	
MSSR	AAP242	Master's student scientific research	3	6					Report	
MSSR	AAP242	Master's student scientific research	4	6					Report	
		Module of final attestation (12 credits)									
FA	ECA205	Registration and defense of the master's thesis	4	12					Defense of dissertation	
			Total	**125**						

5. Descriptors and level of knowledge, skills and competences

the level of training a student are determined based on requirements Dublin descriptors second level higher education (Master) and reflect mastered competence expressed in progress of learning.

Learning outcomes are formulated at the level of the entire educational program of magistracy, and at the level of individual modules or academic discipline.

Descriptors reflect the learning outcomes that characterize the ability of the student:

1) Demonstrate developing knowledge and understanding in the study of information technology and systems, based on advanced knowledge of this area, the development and (or) the application of the ideas in the context of research;

2) to apply to their professional knowledge, understanding and ability to solve problems in the new environment, in a broader interdisciplinary context;

3) the collection and interpretation of the information for forming judgments given social, ethical and scientific considerations;

4) clearly and unambiguously communicate information, ideas, findings, problems and solutions to both specialists and non-specialists;

5) learning skills necessary for independent continuation of further education in the field of information technologies and systems.

6 Competences to complete the training

6.1 Requirements for the key competencies of graduates of the scientific and pedagogical magistracy must:

B - Basic knowledge and skills

B1 - The ability to understand relevant methodical, methodological and philosophical problems of the world and the professional domain;

B2 - Ability to communicate and to search for and exchange of information on the profile of activity in the global computer systems, networks, library funds and other sources of information in a foreign language. Skills design the official documentation on the different forms and types of international cooperation

B3 - The ability to teach in higher education institutions to apply modern methods of teaching, and software and educational resources to manage the process of training in conflict situations, adequate to navigate in a variety of situations on the basis of knowledge in the field of higher education pedagogy and psychology.

P - Professional competence:

P1 - Understand methodologies, models, methods, development tools and design of information systems.

P2 - Building skills of information security in the IP. Skills assessment IC reliability.

P3 - understand the issues mnedzhmenta project in IT:

P4 - Skills development of scientific research. Skills system analysis and synthesis information systems. Skills systematization of scientific research. Skills in writing scientific papers.

P5 - Skills knowledge processing expert systems, the ability to use of methods of artificial intelligence. Skills of designing intelligent systems

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P6 - be able to analyze data for management decision-making.

About - human, social and ethical competence
O1 honesty, truthfulness, openness;
O2 -Communicability;
O3 - creativity and activity.

C - Special and managerial competence:
C1 - Ability to manage a team, take responsibility in decision-making;
C2 - To increase your level of qualification and the educational level of the staff;
C3 - The ability to predict the evolution of the situation.

7. The Diploma by standard ECTS

The application is developed by the standards of the European Commission, the Council of Europe and UNESCO / CEPES. This document is only for academic recognition and is not an official confirmation of the education document. Without higher education diploma is not valid. The purpose of the European filling applications - providing sufficient data about the owner of the diploma obtained the qualification to them, the level of qualifications, the content of the training program, the results of the functional purpose of qualification, as well as information on the national education system. The application model, according to which the translation will be carried out evaluations using the European system of transfers or perezachota credits (ECTS).

The European Diploma Supplement provides the opportunity to continue their education in foreign universities, as well as to confirm the national higher education for foreign employers. When traveling abroad for professional recognition require further legalization diploma of education. The European Diploma Supplement completed in English upon request and is free.

Name module	Professional competence	Disciplines forming the module
Research, Analysis and Data Modeling Module	Competence in the design and support of information systems infrastructure. Be able to use methods of administration of multiuser databases. Use modern DBMS for database processing.	Information systems design, Database development in Microsoft environment SQL, Statistical analysis
Control and data processing module in IS	To acquire practical skills in organizing simulation experiments to evaluate system parameters and determine sensitivity, perform tabular and graphical visualization of results. Analyze the existing enterprise management system and propose	Analysis, modeling and design of IS, Numerical methods in engineering, Data management in information systems, Management in IS, Big Data

solutions for its modernization, taking into account modern information technologies. project management in accordance with modern project management requirements - apply in the project management process with MS Project software. Possess the skills of working with the main tools for the development of artificial intelligence systems	and data analysis, Intelligent methods of data processing, Theory and practice of data analysis and interpretation

8. Description of disciplines

English (professional)
CODE - LNG202
CREDIT - 6 (0/0/3/3)
GOAL AND OBJECTIVES OF THE COURSE
With this course you will learn the specific terminology, you can read specialized literature, obtain necessary knowledge for effective oral and written communication in a foreign language in their professional activities.
BRIEF DESCRIPTION OF THE COURSE
During the training, students are taught a foreign language, including the possession of specialized vocabulary necessary for effective oral and written communication in a foreign language in their professional activities. Practices and methods of development of language skills required in the learning process include: case method, role-plays, dialogues, discussions, presentations, job listening, working in pairs or in groups, performing various writing assignments, tasks and grammatical explanations.
Knowledge, skills, skills to complete the course
As a result of the development of the discipline a student to expand occupational lexical vocabulary, have the skills of effective communication in a professional environment, the ability to properly express thoughts in speech and writing, to understand the specific terminology and read the specialized literature.

History and philosophy of science
CODE - HUM201
CREDIT - 4 (1/0/1/2)
_____
GOALS AND OBJECTIVES OF THE COURSE - reveal the relationship of philosophy and science, identify the philosophical problems of science and scientific knowledge, the main stages of the history of science, the concept of the leading philosophy of science, modern problems of development of scientific and technical reality
BRIEF DESCRIPTION OF THE COURSE - the subject of the philosophy of science, the dynamics of science, the specificity of science, science and prednauki, antiquity and the emergence of theoretical science, the main stages of historical development of science, especially of classical science, neklassicheskakya and post-nonclassical science, mathematics, philosophy, physics, engineering and technology, specific engineering science, ethics of science, social and moral responsibility of the scientist and engineer
Knowledge, skills, skills to complete the course - to know and understand the philosophical questions of science, the basic historical stages of the development of science, the leading concept of the philosophy of science, able to critically evaluate and analyze scientific and philosophical problems, understand the specifics of the engineering sciences, have the skills of analytical thinking and philosophical reflection, be able to justify and defend their position,

own techniques of discussion and dialogue, be skilled kommukativnosti and creativity in their professional activity

Higher School Pedagogy
CODE - HUM205
CREDIT - 4 (1/0/1/2)
GOAL AND OBJECTIVES OF THE COURSE The course focuses on the study of psycho-pedagogical nature of the educational process of the higher school; the formation of ideas about the main trends of development of higher education at the present stage, the consideration of methodological foundations of the learning process in higher education, as well as the psychological mechanisms affecting the success of learning, interaction, control subjects of the educational process. The development of psycho-pedagogical thinking of undergraduates.
BRIEF DESCRIPTION OF THE COURSE During the study course undergraduates are introduced to didactics of the higher school, forms and methods of organization of training in high school, psychological factors of successful learning, especially the psychological impact, mechanisms of educational influence, pedagogical technologies, the characteristics of pedagogical communication, learning management mechanisms. Analyze organizational conflicts and their solutions, psychological destruction and deformation of individual teacher.
Knowledge, skills, skills to complete the course - at the end of the course master student should know the features of a modern system of higher education, the organization of pedagogical research, the characteristics of the subjects of the educational process, didactic bases of the organization of the learning process in higher education, educational technology, patterns of teacher communication, especially educational impact on students, as well as problems of teaching.

Infrastructure Information Systems
CODE CSE250
CREDIT - 6 (2/0/1/3)
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE
The purpose of discipline is the development of design skills and support of information systems infrastructure.
BRIEF DESCRIPTION OF THE COURSE
components of the infrastructure of information systems. Especially infrastructure development of information systems. infrastructure component: operators and developers of information systems. infrastructure components: hardware and communication equipment information systems. infrastructure components: hardware and software systems. Properties of information systems: scalability, interoperability. Improving information systems infrastructure.
Knowledge, skills, skills to complete the course

As a result of studying the discipline undergraduates receive professional competence in the design and support of information systems infrastructure.

Development of a database in an environment Microsoft SQL Server
CODE - SEC241
CREDIT - 6 (2/0/1/3)
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE
The purpose of teaching is to study the development of methods, multi-user database administration encountered and used in the development of modern computer systems of information processing and management.

discipline tasks
Mastering the techniques and methodology of design and development of multi-user database in the development of computer systems for information processing and management.

BRIEF DESCRIPTION OF THE COURSE
Contents includes a client / server database technology, methods of creating multi-user database and its objects, query optimization, enterprise data storage and analysis technology, analytical model processing in the DBMS.

Knowledge, skills, skills to complete the course
As a result of the discipline you need to know:
-   state and development trends of modern database;
-   current models of representation and methods of data processing;
-   methods of constructing multi-user database.

As a result of studying the discipline should be able to:
-   design the information domain model;
-   be able to use multi-user database management techniques;
-   use modern database for database processing.

IS data management
CODE - CSE714
CREDIT - 6 (2/0/1/3)
PREQUISIT- Management in information systems
PURPOSE OF STUDY: To study the principles and methods of data management in information systems, databases and data warehouses.
SHORT DESCRIPTION OF THE COURSE
Principles and methods of data management in information systems. Transaction management. Ensuring data integrity in the database. Management of concurrent transaction processing. Data Warehouse Concept. Data warehouse architecture. Data Mining.
KNOWLEDGE, SKILLS, COMPLETION OF THE COURSE knowledge of data management in information systems, databases and data warehouses.

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Information systems
CODE - CSE139
CREDIT - 6 (1/1/1/3)
 Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline "Design of Information Systems" is the development of terminology, standards, methodologies and techniques of designing enterprise information systems.

Objectives of the course - consolidation of practical skills acquired in previous courses for the design of enterprise information systems.

BRIEF DESCRIPTION OF THE COURSE

In the discipline of "Design of Information Systems" examines the theoretical and practical aspects of the use of standards, methodologies and techniques for designing information systems companies. The lecture course discusses the features of the architecture of enterprise information system, basic approaches and design standards ensure that all types of information systems, including mathematical, technical, software, information, organizational, legal, linguistic and ergonomic.

Knowledge, skills, skills to complete the course

undergraduate

must know:

- the basic concepts and terminology of the design of information systems;

- basic standards, methodology and design techniques;

should be able to:

- analyze existing enterprise management system and offer solutions for modernization based on modern information technologies.

Analysis, Modeling and information systems
CODE -CSE202
CREDIT - 6 (1/0/2/3)
Prerequisite - mathematics, probability theory and statistics

OBJECT AND PROBLEM OF THE COURSE The study of the principles and methods of modeling stochastic parameters and processes of complex systems and analyzing their functioning

BRIEF DESCRIPTION OF THE COURSE

Methods of generating random events, and one-dimensional vector of random variables used in the identification and analysis of information processes. Methods and algorithms for the simulation of stationary and non-stationary random processes in the design of information systems. Methods for modeling and analysis of ordinary and extraordinary flow of information in information systems.

Knowledge, skills, skills to complete the course

A master's degree as a result of the discipline is to:

− to acquire basic knowledge about the principles of constructing models of systems and processes of their functioning in the basic paradigms of simulation;

− know the typical classes of models and methods of modeling of complex systems, the unit of the Monte-Carlo, the principles of construction of models of processes of complex systems, and methods of algorithmic formalization;

− master tool environment simulation, analysis and design of information systems;

− acquire practical skills for organizing simulation experiments to evaluate the parameters of the system and determine the sensitivity, performance tabular and graphical visualization of results;

− have skills of development models of typical processes and systems for information processing and management.

Models and methods of artificial intelligence
CODE - CSE210
CREDIT - 6 (2/1/0/3)
Prerequisite - MAT 102 Mathematics 3
GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline yavlyaetsyaizuchenie theoretical and practical provisions of the theory of artificial intelligence, the development of skills of application of methods and models of artificial intelligence, the use of technologies for the creation of practical artificial intelligence systems.

BRIEF DESCRIPTION OF THE COURSE

Introduction to Artificial Intelligence. classification of tasksartificial intelligence. Review of AI research. Models and methods of knowledge representation. Tools of intelligent systems, stage design of artificial intelligence systems. Expert systems. The development of systems based on knowledge.

Knowledge, skills, skills to complete the course

Expected results: As a result of studying the discipline "Models and methods of artificial intelligence," graduate student should:

- to know the basic methods of development of artificial intelligence systems and the specifics of the actual problem areas;

- Be able to work with different knowledge representation models and support the choice of a particular model, depending on the nature of the subject area and the specific tasks, build the structure of intellectual application system;

- be skilled in working with major development tools of artificial intelligence systems;

- have experience in the design and development of artificial intelligence systems for a particular subject area.

Models and statistical methods
CODE - CSE212
CREDIT - 6 (2/0/1/3)
Prerequisite - MAT 102 Mathematics 3

GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline is the development of skills of application of models and methods of statistical research data for the design and maintenance of information systems.

BRIEF DESCRIPTION OF THE COURSE

Descriptive analysis of the data. Correlation and variance analysis. Methods for regression analysis, statistical, econometric models. Time series model. Cointegration of time series. Prediction and interpretation of results. Evaluation of the quality of statistical modeling. Complex application of methods and statistical data exploration models.

Knowledge, skills, skills to complete the course

As a result of studying the discipline undergraduates receive professional competence in the application of models and methods of statistical data research for the design and maintenance of information systems.

Models and methods of decision-making in the IP
CODE -CSE211
CREDIT - 6 (2/0/1/3)
Prerequisite - no

GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline

The purpose of teaching is to study the basics of operations management and decision-making, as well as specific models and methods encountered in the development and use of modern computer information processing and control systems.

discipline tasks

The development of methods and operation management methodology in the design of computer systems for information processing and management.

BRIEF DESCRIPTION OF THE COURSE

Contents includes a mathematical operation control methods, methods for solving nonlinear unconstrained optimization methods for solving nonlinear constrained optimization problems, application of the methods and operation of the methodology in the design of computer systems for information processing and management.

Knowledge, skills, skills to complete the course

As a result of the discipline you need to know:

- to know the state of the subject, its methodology, practical importance, development prospects;

As a result of studying the discipline should be able to:

- be able to build a model of the system or its operation to be performed, set the task of research, apply mathematical methods and computational tools to produce the desired results, analyze these results;

- study have the skills of an operation as a whole, as well as pre quantitatively prove optimality solutions operation management tasks.

MANAGEMENT IN INFORMATION SYSTEMS
CODE - CSE125
CREDIT - 6 (2/1/0/3)
prerequisite - Infrastructure Information Systems
GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline "Management information systems" is the development of terminology, standards, methodologies and management information processes in enterprises.

Objectives of the course - the skills of research and modernization of enterprise information technology management systems.

BRIEF DESCRIPTION OF THE COURSE

In the discipline of "management information systems" deals with the theoretical and practical aspects of the use of information management technology in information systems. The lecture course discusses the features of the terminology infrastructure management systems and provides services, including incident management, problem management, configuration management, change management, release management. We consider such methodologies as ITIL / ITSM, CobIt, MOF, ISO / IEC 20000, Methodology of HP - ITSM Reference Model, model information processes ITPM.

Knowledge, skills, skills to complete the course
undergraduate
must know:
- the basic concepts and terminology of information management;
- basic standards, methodology and methods of management information processes of the enterprise;
should be able to:
- producing analysis of infrastructure and information processes enterprise management system and offer solutions for their optimization.

BIG DATA and data analysis
CODE - SEC246
CREDIT - 6 (2/1/0/3)
Prerequisite - Development of a database in an environment Microsoft SQL Server
GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline «BIG DATA and data analysis" is the development of terminology, principles of organization and storage technology, transformation and processing of large data analysis, as well as the practical skills of using these technologies.

Objectives of the course - the skills of the use of large research data in information systems to solve practical problems.

BRIEF DESCRIPTION OF THE COURSE

In the discipline of «BIG DATA» The theoretical and practical aspects of using big data technologies in information systems. The lecture course discusses the features of the terminology, trends in the development of infrastructure solutions in Big Data, location data services in enterprise architecture, as well as questions of big data analytics, trends and prospects of development of this technology.

Knowledge, skills, skills to complete the course
undergraduate
must know:
- the basic concepts and terminology of big data;
- the basic principles of the use of large data enterprise architecture;
- the basic methods of analytical processing of large data;
should be able to:
- create programs for analytical processing of large data in the language of R;
- use Hadoop and MapReduce technology when working with large data.

Data management information systems
CODE CSE714
CREDIT - 6(2/0/1/3)
Prerequisite - management information systems
GOAL AND OBJECTIVES OF THE COURSE

The study of data management principles and techniques in information systems, databases and data warehouses.

BRIEF DESCRIPTION OF THE COURSE

Data management principles and techniques in information systems. Transaction management. Ensuring the integrity of the data in the database. concurrency management transactions. The concept of the data warehouse (Data Warehouse). Architecture of data warehouses. Data mining (Data Mining).

Knowledge, skills, skills to complete the course

Expected results - knowledge of data management in information systems, databases and data warehouses.

Geographic Information systems

CODE - SEC 242

CREDIT - 6 (1/1/1/3)

Prerequisite - Analysis, modeling and design of information systems

GOAL AND OBJECTIVES OF THE COURSE

The aim of the course is to familiarize undergraduates with existing geographic information system (GIS) training the typical structure of modern geographic information systems and its functionality. As a result of this course, students will be able to use the basic elements of the structure of geographic information systems database.

BRIEF DESCRIPTION OF THE COURSE

Introduction of GIS. Principles and GIS functions. Components (components) GIS. The choice of software. Creating a project - loading data into the project and its structure. Management views. The data structure in the GIS. Training, visualization and data analysis.

Knowledge, skills, skills to complete the course

Know the basic concepts and terminology GIS;

Be able to design information systems using GE technology, learn to work with GE on advanced applications.

Have the skills to work with modernsoftware.

Theory and practice of data analysis and interpretation

CODE - CSE219

CREDIT - 6 (2/0/1/3)

Prerequisite - Analysis, modeling and design of information systems

GOAL AND OBJECTIVES OF THE COURSE

The purpose of discipline is the development of skills of interpretation of application of these methods in the design and maintenance of information systems.

BRIEF DESCRIPTION OF THE COURSE

Concept analysis and data interpretation. Descriptive analysis of the data. Correlation and variance analysis. Evaluation of data volatility.

Quantitative and qualitative indicators are used in interpreting the data. Visual interpretation of the data. Modeling forecast data values. Prediction and interpretation of results. Evaluation of data quality forecasting. Complex application analysis and interpretation in the field of information systems. Software tools for data analysis and interpretation.

Knowledge, skills, skills to complete the course

As a result of studying the discipline undergraduates receive professional competence in the field of application of the theory and practice of the analysis and interpretation of data for the design and maintenance of information systems.

The educational program of the scientific and pedagogical magistracy includes two types of practices:

- pedagogical;
- research.

Pedagogical practice is carried out with the aim of developing practical skills and teaching methods. Pedagogical practice can be carried out during the period of theoretical training without interrupting the educational process. The research practice of the undergraduate is carried out with the aim of acquainting with the latest theoretical, methodological and technological achievements of domestic and foreign science, with modern methods of scientific research, processing and interpretation of experimental data.

Research work of a master student Research work in the scientific and pedagogical magistracy should:

- correspond to the main problematics of the specialty in which the master's thesis is being defended;
- be relevant, contain scientific novelty and practical significance;
- be based on modern theoretical, methodological and technological achievements of science and practice;
- carried out using modern methods of scientific research;
- contain research (methodological, practical) sections on the main protected provisions;
- be based on advanced international experience in the relevant field of knowledge.
- performed using advanced information technologies;
- contain experimental and research (methodological, practical) sections on the main protected provisions.

Master's project defense

CODE – ECA2013

CREDIT –12

The purpose of the master's thesis / project is:

demonstration of the level of scientific / research qualifications of a master student, the ability to independently conduct a scientific search, test the ability to solve specific scientific and practical problems, knowledge of the most general methods and techniques for their solution.

SHORT DESCRIPTION

Master's thesis / project is a final qualifying scientific work, which is a generalization of the results of independent research by a master's student of one of the topical problems of a particular specialty of the corresponding branch of science, which has internal unity and reflects the course and results of the development of the chosen topic.

Master's thesis / project is the result of the research / experimental research work of the master's student, carried out during the entire period of study of the master's student.

The defense of a master's thesis is the final stage of the master's preparation. Master's thesis / project must meet the following requirements:

- the work should conduct research or solve topical problems in the field of information security;

- work should be based on the definition of important scientific problems and their solution;
- decisions must be scientifically grounded and reliable, have internal unity;
- the thesis / project must be written individually.

Content

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