Module Reference Book

Information Systems (Ba)

Table of Contents

Module Name:	**Module 1: Basics of Natural Sciences**
Code	M1IS(Ba)
Module Elements:	*Compulsory Subject* Physics
Semester Number:	1
Person responsible for the module	P.I. Leontyev
Lecturer:	Physics - P.I. Leontyev
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week – 6 (lectures -1; labs-1; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 30 hours Extracurricular Classes: 60 hours Total: 90 hours
Credit Points:	3 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in high school during the course of Physics
Expected Learning Outcomes:	Know the basic physical phenomena and laws of classical and modern Physics. Be able to apply physical phenomena, laws and modern methods for solving applied problems. Possess the skills to solve engineering problems using the laws of Physics. Demonstrate the ability to conduct a physical experiment, work with measuring instruments, as well as those used for data calculation and processing.
Intendend use/applicability	Modules: Basics of the Profession, Basics of Information Systems
Content:	*Physics* Mechanics. Molecular Physics. Thermodynamics. Electricity and Magnetism. Optics. Elements of Atom and Nucleus Physics.
Examination Form, module mark:	*Physics* – computer-based testing Module mark: the result of the exam *Physics*
Technical/Multimedia Facilities:	Multimedia system, laboratories of Mechanics, Optics and Electric Power, IT room with Internet access, internal educational network of the University.
Study Materials:	1. T.I. Trofimova. Course of Physics. Moscow, 2003 2. A. A. Detlaf, B. M. Yavorskiy. Course of Physics, M., 2000 3. L. A. Dyachenko, I. I. Golovaschenko. Collection of Problems on Physics. Petropavlovsk, 2009 4. I. V. Savelyev. Course of General Physics. Ed. 5, SR. Saint Petersburg: Lan, 2006. 5. T. I. Trofimova. Collection of Tests on the General Course of Physics, Moscow, 2004 6. T. M. Trofimova. Physics Basics. Book 1-5.: Moscow, 2007 7. L. A. Dyachenko. Laboratory Practical Course for Technical Professions, Petropavlovsk: NKSU, 2009
Date of last amendment	20.01.2020

Module Name:	**Module 2: Basics of Mathematics**
Code	M2IS(Ba)
Module Elements:	*Compulsory Subjects* Mathematics 1 Mathematics 2
Semester Number:	1, 2
Person responsible for the module	B.V. Rabinovich
Lecturer:	Mathematics 1 - B.V. Rabinovich Mathematics 2 - B.V. Rabinovich
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week – 6 (lectures -1; workshops -1; independent work of students -4); hours per semester – 90. 2 semester: hours per week – 6 (lectures -1; workshops -1; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 120 hours Total: 180 hours
Credit Points:	6 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in high school in the courses of Algebra and Pre-calculus, and Geometry
Expected Learning Outcomes:	Know the course of Higher Mathematics. Be able to apply modern mathematical methods to solve applied problems. Possess the skills to solve engineering problems using mathematical methods. Demonstrate the ability to perform calculations and justification of technical solutions adopted during the development.
Intendend use/applicability	Modules: Mathematics, Programing Basics
Content:	*Mathematics 1* Elements of linear algebra and analytic geometry. Basic concepts of mathematical analysis. Differential calculus of a function of one variable and its application to the study of functions. Elements of linear algebra and analytic geometry. *Mathematics 2* Introduction to mathematical analysis. Differential calculus of a function of one variable and its applications. Integral calculus of a function of one variable and its applications. Differential calculus of a function of many variables. Multiple integrals and their applications. Theory of series. Differential equations. Elements of probability theory and mathematical statistics.
Examination Form, module mark:	Comprehensive examination including: *Mathematics1* – written examination *Mathematics2* – computer-based testing Module mark: the result of the exam *Mathematics2*
Technical/Multimedia Facilities:	Multimedia system, IT room with Internet access, internal educational network of the University.

Study Materials:	1. D. T. Pismenniy. Abstract of Lectures on Higher Mathematics. Part 1. M.: Ayris Press, 2004 2. K. I. Lungu, D. T. Pismenniy. Collection of Tests in Higher Mathematics. Part 1. Moscow. Ayris Press, 2001. 3. P. Y. Danko, A. G. Popov. Higher Mathematics in Exercises and Problems. Part 1. Moscow: Vysshaya Shkola, 2002. 4. Y. S. Bugrov, S. M. Nikolskiy. Elements of Linear Algebra and Analytic Geometry. Moscow. Nauka. 2000. 5. P. Y. Danko, A. G. Popov, T.Y. Kozhevnikova. Higher Mathematics in Exercises and Problems. Part 2. Moscow: Vysshaya Shkola, 2006. 6. Demidovich. Collection of Problems in Mathematical Analysis for Technical Colleges. M.: Vysshaya Shkola, 2001. 7. L. A. Kuznetsov. Collection of Problems in Higher Mathematics. – Moscow: Vysshaya Shkola, 2006. 8. Y. S. Mironenko. Higher Mathematics (Methodical Instructions and Control Tasks). M.: Vysshaya Shkola, 2002.
Date of last amendment	20.01.2020

Module Name:	**Module 3: History of the State**
Code	M3IS(Ba)
Module Elements:	*Compulsory Subject* Modern History of Kazakhstan
Semester Number:	2
Person responsible for the module	A.A. Pleshakov
Lecturer:	Modern History of Kazakhstan – A.A. Pleshakov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	2 semester: hours per week – 8 (lectures -1; workshops -1; independent work of students -6); hours per semester – 120.
Workload:	Teaching Load: 30 hours Extracurricular Classes: 90 hours Total: 120 hours
Credit Points:	4 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject of the module
Recommended Conditions:	The discipline is based on the knowledge and skills of students obtained in the school in the following disciplines: History of Kazakhstan, World History, People and Society, World Art, Literature.
Expected Learning Outcomes:	Know: the main stages of the history of Kazakhstan in the context of world history. Be able to: distinguish scientific and not scientific views on historical processes. Possess the skills: to work with historical sources of information; to analyze the situation of conflict of interest and moral choice. Demonstrate the ability to: professionally understand the social, cultural and political conditions of the modern world.
Intendend use/applicability	Modules: Social and Humanitarian Knowledge, Philosophy
Content:	*Modern History of Kazakhstan* The study of the history of Kazakhstan as the original and at the same time as an integral part of world history; to reveal the role and place of the Kazakh people in the world community at various stages of formation and development; to show the main regularities of ethno-genetic processes on the territory of Kazakhstan; to consider features of development of socio-economic relations and the key problems of the political history; to trace the evolution of material and spiritual culture.
Examination Form, module mark:	*Modern History of Kazakhstan* - computer-based testing Module mark: the result of the exam *Modern History of Kazakhstan*
Technical/Multimedia Facilities:	Portable and stationary multimedia systems.
Study Materials:	1. History of Kazakhstan. Essay. - A. 2003. 2. S. G. Sheretov. Recent History of Kazakhstan (1985-2002). – A. 2009. 3. History of Kazakhstan: Peoples and Cultures: Text Book / N. E. Masanov et al. - A., 2001. 4. History of Kazakhstan and Central Asia: Text Book / M. K. Abuseitova et al. - A., 2001. 5. History of Kazakhstan. In 5 books. - A., 1996-2011.
Date of last amendment	20.01.2020

Module Name:	**Module 4: Foreign Language**
Code	M4IS(Ba)
Module Elements:	*Compulsory Subject* English (German) Language
Semester Number:	1, 2
Person responsible for the module	I.A. Olkova
Lecturer:	English (German) Language - I.A. Olkova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week –12 (workshops -4; independent work of students -8); hours per semester – 180. 2 semester: hours per week – 6 (workshops -2; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 90 hours Extracurricular Classes: 180 hours Total: 270 hours
Credit Points:	9 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	Minimal sufficient level of foreign language proficiency, which students receive in secondary school.
Expected Learning Outcomes:	Know: basic grammar and vocabulary required for reading and translating (with a dictionary) of texts in a foreign language; basic spelling rules; main parts of speech; structure of a simple and a complex sentence. Be able to: communicate (orally and in writing) in a foreign language on everyday topics; build simple and complex sentences; comprehend messages of a domestic or informational nature. Possess the skills: to improve own speaking and written speech, vocabulary; reading, monologue speech within the study topics; translation of the text in accordance with language norms. Demonstrate the ability to: build a monologue and a dialogue; reasoned presentation of own point of view in interpersonal communication in a foreign language; extract the necessary information from the authentic text in a foreign language; fill in most personal and business forms (questionnaires, CV).
Intendend use/applicability	Modules: Information and Communication Technologies, Profound Language Learning
Content:	*English (German) Language* Vocabulary: Social and Domestic Communication: Family in modern society, Housing and accommodation; Social and Cultural Communication: Kazakhstan, Country studies (English speaking countries: culture, geography, economy), Leisure, Traveling; Educational and Professional Communication: Education, My University, Jobs and Professions, My future profession, Professional competence, Advantages and disadvantages of different professions; Social and Cultural Communication: Health and Healthy Life Style, Law, Human Rights, Environment and environmental problems, Mass Media Grammar:

	- Tenses (Present, Past, Future – Simple, Continuous, Perfect); - Conditional sentences; - Reflexive, Possessive and Relative Pronouns; - Passive Voice; - Modal verbs (might, could, might, can); - Reported Speech; - Connectors (although, however, thus…); - Quantifiers (a few, a little etc.); - Adverbs of frequency; - Degrees of comparison (adjectives and adverbs)
Examination Form, module mark:	Comprehensive examination including: *English (German) Language (1 semester)* – written examination *English (German) Language (2 semester)* - computer-based testing Module mark: the result of the exam *English (German) Language (2 semester)*
Technical/Multimedia Facilities:	Multimedia language laboratory, interactive whiteboard, multimedia system
Study Materials:	1. Sue Kay & Vaughan Jones. Inside Out - Elementary: Macmillan, 2003. 2. Luke Prodromou. Rising Star – An Intermediate Course: Macmillan, 2001. 3. Raymond Murphy. English Grammar in Use: Cambridge University Press, 2004. 4. Simon Clarke. Macmillan English Grammar in Context: Macmillan, 2008. 5. I. Agabekyan, P. Kovalenko. English for Engineers. - 4th ed., Rostov-on-Don: Phoenix, 2006. 6. G. E. Vyborova, K. S. Makhmuryan, O. P. Melchina. Easy English: Basic course: M.: AST-Press Kniga, 2005.
Date of last amendment	20.01.2020

Module Name:	**Module 5: National Language**
Code	M5IS(Ba)
Module Elements:	*Compulsory Subject* Kazakh Language
Semester Number:	1, 2
Person responsible for the module	D.K. Kuandykova
Lecturer:	Kazakh Language - D.K. Kuandykova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week –12 (workshops -4; independent work of students -8); hours per semester – 180. 2 semester: hours per week – 6 (workshops -2; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 90 hours Extracurricular Classes: 180 hours Total: 270 hours
Credit Points:	9 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	Minimal sufficient level of proficiency in the state language, which students receive in secondary school
Expected Learning Outcomes:	Know: basic concepts of speech culture (literary language, language norm, language variants); principles of speech communication; orthoepic, lexical, grammatical and stylistic norms of the Kazakh literary language. Be able to: build oral and written statements in accordance with the norms of the Kazakh literary language, logically substantiate the stated provisions; competently conduct business correspondence; use dictionaries and reference literature on the Kazakh language; use the language to establish interpersonal relations in a professional environment. Possess the skills: to improve their own oral and written speech, vocabulary; reading, monologue speech within the study topics; translation of the text in accordance with language norms. Demonstrate ability: proficiency in linguistic apparatus and basic communication skills necessary for successful professional performance
Intendend use/applicability	Modules: Profound Language Learning, Final Internship
Content:	*Kazakh Language* Man and society. North Kazakhstan State University named after M. Kozybayev. Food is the basis of a man. Cleanliness is the basis of health, Health is the basis of wealth. Modern clothing samples. Native land. Our city is Petropavlovsk. Man and Nature. Journey. Historical sights. Art and culture. Famous people. Historical figures. My country is Kazakhstan. Education system of Kazakhstan. Society and youth. Man and law.
Examination Form, module mark:	Comprehensive examination including: *Kazakh Language (1 semester)* – written examination *Kazakh Language (2 semester)*- computer-based testing Module mark: the result of the exam *Kazakh Language (2 semester)*

Technical/Multimedia Facilities:	Multimedia language laboratory, interactive whiteboard, multimedia system
Study Materials:	1. A. Aldasheva, Z. Akhmetzhanova, K. Kadasheva, E. Suleymenova. Official papers. "Sosdik-Slovar" A., 2002 2. Z. Akhmetzhanova, Z. Yernazarova. Business Kazakh Language. Basic level. Almaty: Arkhisema Publishing House, 2007 3. A. Bekturova, S. Bekturov. Kazakh Language for Everyone. Almaty: Atamura, 2004 4. Paper Work in the Republic of Kazakhstan. Almaty, 2005 5. M. Pirimbetova. Record Keeping in the Kazakh Language. Textbook. Astana, 2007 6. A. Kokanbayev, K. Musabekov, K. Ashimuly. Russian-Kazakh and Kazakh-Russian Dictionary of Petrochemical Terms and Phrases. Almaty, 2007 7. R. Kudaybergenov. Dictionary of Technical Terms. Almaty, 2009
Date of last amendment	20.01.2020

Module Name:	**Module 6: Recreation Classes (Beginner Level)**
Code	M6IS(Ba)
Module Elements:	*Compulsory Subject* Physical Education
Semester Number:	1, 2
Person responsible for the module	A.A. Shitov
Lecturer:	Physical Education - A.A. Shitov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week –4 (labs-1; independent work of students -3); hours per semester – 60. 2 semester: hours per week – 4 (labs-1; independent work of students -3); hours per semester – 60.
Workload:	Teaching Load: 30 hours Extracurricular Classes: 90 hours Total: 120 hours
Credit Points:	4 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject of the module
Recommended Conditions:	Physical Education in school
Expected Learning Outcomes:	Know: social functions of physical education; systems of physical education; hygienic bases of health management; prevention of occupational diseases. Be able to: use the means and methods of physical education to maintain a special professional performance, health and prevention of occupational diseases; plan, monitor and manage physical and functional fitness. Possess the skills: show and do exercises, assess the adequacy of the loads to the functional capabilities of the body; management of physical fitness. Demonstrate the ability: to fulfill the Presidential Tests of Physical Fitness; execution of tactics and rules of competition in applied sports.
Intendend use/applicability	Modules: Recreation Classes (Intermediate Level)
Content:	*Physical Education* 1 semester: track and field athletics and basketball (beginner). 2 semester: swimming and volleyball (beginner).
Examination Form, module mark:	*Physical Education* – graded test Module mark: the result of the exam *Physical Education*
Technical/Multimedia Facilities:	Gym, swimming pool, sports ground, play court
Study Materials:	Track and Field Athletics. Textbook for Physical Education Institutes. Ed. N.G. Azolin, D. P. Markov, 2nd edition, – M., 2002 Basketball. Textbook for Universities. M., 2007. Swimming for Beginners. K. Wilke. M.: Znaniye, 2001 Basics of Swimming. Learning and the Way to Perfection. M. Pedroletti. M.: Phoenix, 2006. Volleyball. Textbook. A. V. Belyaev, N. V.Savin. M.: Fizkultura, 2000 Physical Education. Textbook for Universities. M. V. Sokolova. Almaty: RIK, 2005.
Date of last amendment	20.01.2020

Module Name:	**Module 7: Recreation Classes (Intermediate Level)**
Code	M7IS(Ba)
Module Elements:	*Compulsory Subject* Physical Education
Semester Number:	3, 4
Person responsible for the module	A.A. Shitov
Lecturer:	Physical Education - A.A. Shitov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	3 semester: hours per week –4 (workshops -1; independent work of students -3); hours per semester – 60. 4 semester: hours per week – 4 (workshops -1; independent work of students -3); hours per semester – 60.
Workload:	Teaching Load: 30 hours Extracurricular Classes: 90 hours Total: 120 hours
Credit Points:	4 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	Physical Education (Beginner Level)
Expected Learning Outcomes:	Know: social functions of physical education; systems of physical education; hygienic bases of health management; prevention of occupational diseases. Be able to: use the means and methods of physical education to maintain a special professional performance, health and prevention of occupational diseases; plan, monitor and manage physical and functional fitness. Possess the skills: show and do exercises, assess the adequacy of the loads to the functional capabilities of the body; management of physical fitness. Demonstrate the ability: to fulfill the Presidential Tests of Physical Fitness; execution of tactics and rules of competition in applied sports.
Intendend use/applicability	
Content:	*Physical Education* 3 semester: track and field athletics and basketball (intermediate). 4 semester: swimming and volleyball (intermediate).
Examination Form, module mark:	*Physical Education* – graded test Module mark: the result of the exam *Physical Education*
Technical/Multimedia Facilities:	Gym, swimming pool, sports ground, play court
Study Materials:	Track and Field Athletics. Textbook for Physical Education Institutes. Ed. N.G. Azolin, D. P. Markov, 2nd edition, – M., 2002 Basketball. Textbook for Universities. M., 2007. Swimming for Beginners. K. Wilke. M.: Znaniye, 2001 Basics of Swimming. Learning and the Way to Perfection. M. Pedroletti. M.: Phoenix, 2006. Volleyball. Textbook. A. V. Belyaev, N. V.Savin. M.: Fizkultura, 2000 Physical Education. Textbook for Universities. M. V. Sokolova. Almaty: RIK, 2005.
Date of last amendment	20.01.2020

Module Name:	**Module 8: Social and Humanitarian Knowledge**
Code	M8IS(Ba)
Module Elements:	*Compulsory Subjects* Manashtanu Political and Social Studies Cultural Studies and Psychology
Semester Number:	1, 2
Person responsible for the module	A.V. Nikiforov
Lecturer:	Manashtanu – N.A. Abuov Political and Social Studies – A.V. Chukhno Cultural Studies and Psychology - A.V. Nikiforov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week – 10 (lectures -2; workshops -2; independent work of students -6); hours per semester – 150. 2 semester: hours per week – 6 (lectures -1; workshops -1; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 90 hours Extracurricular Classes: 150 hours Total: 240 hours
Credit Points:	8 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	The study of the discipline is based on the knowledge and skills of students obtained in the following subjects of school: Man and Society, World History, World Art, Literature, History.
Expected Learning Outcomes:	Know: history of the University, historical milestones in the life and work of academician M. Kozybayev; theoretical and practical problems of modern business communication; the essence of socio-political processes and the role of political parties and social movements; cultural heritage of different religions. Be able to: apply the principles and methods of historical knowledge; apply the methods of collecting sociological information; freely navigate in issues of world religions. Possess the skills: work with historical sources of information; analyze the situation of conflict of interest and moral choice; ethics and psychology of business conversation. Demonstrate the ability to: professionally understand the social, cultural and political conditions of the modern world.
Intendend use/applicability	Modules: Philosophy
Content:	*Manashtanu* The history of the University, the prospects for the development of the University in the future, historical milestones in the life and work of academician M. Kozybayev in different periods of his life, a scientific problem, which developed M. Kozybayev in the course of his life. *Political and Social Studies* Society as a socio-cultural and socio-dynamic system; system and structural-functional approaches to the analysis of society; the basic laws and patterns of development of society. Personality and society, factors of personality formation. Social institutions and processes. Methods and techniques of sociological research. Analysis of the collected information.

	Report and recommendations on the results of sociological research. Object, subject and method of political science; functions of political science; political life and power relations; role and place of politics in the life of modern societies; civil society, its origin and features; institutional aspects of politics; political system; political parties, political conflicts and ways of their resolution; political elites; foreign policy of the Republic of Kazakhstan. *Cultural Studies and Psychology* The concept and essence of culture. Typology of culture. Culture and people. The genesis of the culture. Values of ancient cultures. Values of national Kazakh culture. Methods and branches of psychology. The problem of personality in psychology. Psychology of groups and communities.
Examination Form, module mark:	Comprehensive examination including *Manashtanu* – reference paper *Political and Social Studies* - computer-based testing *Cultural Studies and Psychology* computer-based testing Module mark: the result of the exam *Cultural Studies and Psychology*
Technical/Multimedia Facilities:	PowerPoint presentations, electronic texts and maps, multimedia system
Study Materials:	M. K. Gorshkov. Applied sociology: methodology and methods: Textbook /M. K. Gorshkov, F. E. Sheregi. – M.: Alha_M:INFRA-M, 2009. S. A. Kravchenko. Sociology: Paradigms from the Perspective of Sociological Imagination: Textbook for universities /S. A. Kravchenko. – 2nd ed. updated and revised.– M.: Egzamen Publishing House, 2004. K. S.Gadzhiyev. Political Science: Basic Course: Textbook./ K. S. Gadzhiyev. - 2nd ed., updated and revised. – M.: YURAIT, 2012. Political Science: Textbook for Bachelors / under the editorship of V. A. Achkasov, V. A. Gutorov. - 2nd ed., updated and revised. – M.: YURAIT, 2012. V. N. Lavrinenko. Political Science. -3rd ed., updated and revised - M.: UNITY, 2010. S. K. Zhantikeyev. Psychology, Yelorda, Astana, 2011. R. S. Nemov. Psychology. Vol. 1,2, M., Vlados.2012. Cultural Studies. / Textbook under the editorship of M. G. Bagdasaryan, 5th ed. M.: Vysshaya shkola, 2006. V. G. Torosyan. Cultural Studies. History of World and National Culture. M., 2005. Y. A. Malyuga, Cultural Studies. M., 2005
Date of last amendment	20.01.2020

Module Name:	**Module 9: Programing Basics**
Code	M9IS(Ba)
Module Elements	*Compulsory Subject* Algorithms, Data Structures and Programming
Semester Number:	2
Person responsible for the module	L.V. Dolmatova
Lecturer:	Algorithms, Data Structures and Programming – L.V. Dolmatova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	2 semester: hours per week – 14 (lectures -1; workshops -1; labs-4; independent work of students -8); hours per semester – 210.
Workload:	Teaching Load: 90 hours Extracurricular Classes: 120 hours Total: 210 hours
Credit Points:	7 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of the previous undergraduate subjects: Mathematics 1.
Expected Learning Outcomes:	Know: basics of algorithmization, methods of describing algorithms, algorithmic high-level languages, language dictionary, program structure, description of data types, dynamic data structures, basic operators of high-level languages, modular programs, as well as elements of structural programming, development of programs in a high-level language, basic information on the operating system, programming style, and methods of design and verification of programs. Be able to: develop block diagrams of various algorithms, organize the required data structures depending on the requirements of the task, choose a programming language, develop programs in the selected programming language using the language tools and write programs in a good style, debug and test programs, make high-quality software documentation. Possess the skills: program design, program debugging, apply modern programming technologies. Demonstrate the ability to apply the acquired skills in practice.
Intendend use/applicability	Modules: Basics of Information Systems, Databases and Information Protection
Content:	Learning the basics of algorithmization of tasks, classification of programming languages, data types and classification of programming language operators, program development using subroutines, standard modules of programming style, programming quality indicators, methods of debugging and testing programs, basics of object-oriented programming.
Examination Form, module mark:	*Algorithms, Data Structures and Programming* - computer-based testing Module mark: the result of the exam *Algorithms, Data Structures and Programming*
Technical/Multimedia Facilities:	Multimedia system. IT room.
Study Materials:	V. B. Popov. Turbo Pascal for Schoolchildren, Textbook M.: Finance and Statistics 2010. 528 p.: with pictures

	A.Y. Arkhangelskiy. PASCAL Language and Basics of Programming in DELPHI/ Textbook M.: Binom Progress LLC, 2009. 496 p.: with pictures
	A.Y. Arkhangelskiy. Programming in Delphi 6. Moscow: Izdatelstvo BINOM CJSC, 2011 -1120 p.: with pictures
	D. Gudenko, D. Petrochenko. Collection of Programming Problems. St. Petersburg: Piter 2013. -475 p.
	V. P. Kirnos. Practical Course on the Solution of Problems in PASCAL, Karaganda, 2008
	V. P. Kirnos. Problem Solving and Numerical Methods in PASCAL, Karaganda, 2007.
Date of last amendment	20.01.2020

Module Name:	**Module 10: Mathematics**
Code	M10IS(Ba)
Module Elements	*Compulsory Subject* Mathematics 3
Semester Number:	3
Person responsible for the module	A.A. Tadzhigitov
Lecturer:	Mathematics 3 – A.A. Tadzhigitov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	3 semester: hours per week – 10 (lectures -1; workshops -2; labs-1; independent work of students -6); hours per semester – 150.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 90 hours Total: 150 hours
Credit Points:	5 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of the previous undergraduate subjects: Mathematics 1, Mathematics 2.
Expected Learning Outcomes:	Know: the main types of ordinary differential equations of the first and higher orders and methods of their solution; systems of differential equations and methods of their solution; methods of representation of functions by means of series Be able to: prove mathematical sentences and use them in solving problems; Possess the skills: solutions of ordinary differential equations and systems of differential equations; independent replenishment of mathematical knowledge; examination of numerical and functional series for convergence. Demonstrate the ability to: generalize, analyze, perceive information, set a goal and choose ways to achieve it.
Intendend use/applicability	Modules: Processes and Systems Simulation
Content:	To study the basic methods of solving differential equations and their systems; to learn to examine the numerical and functional series for convergence.
Examination Form, module mark:	*Mathematics 3* - computer-based testing Module mark: the result of the exam *Mathematics 3*
Technical/Multimedia Facilities:	Multimedia system. IT room.
Study Materials:	N. Y. Vilenkin et al. Differential Equations. M.: Prosvescheniye, 2009. K. N. Lungu et al. Collection of Problems in Higher Mathematics, in 2 books, Book 2. M., Ayris Press, 2011. A. F. Filippov. Collection of Problems on Differential Equations. M.: Nauka, 2009. G. M. Fichtenholz, Course of Differential and Integral Calculus, in 3 books, M.: Fizmatlit, 2008 V. I. Arnold. Ordinary Differential Equations. M.: Akademiya, 2010 B. V. Rabinovich. Course of Lectures on Higher Mathematics for the Specialty of Information Systems, Part 1, Petropavlovsk, 2001

	S. N. Zankin, B. V. Rabinovich, Collection of Problems in Higher Mathematics for the Specialty of Information Systems, Part 1, Petropavlovsk, 2004 I. P. Natanson, Summation of Infinitely Small Quantities, a series of Popular Lectures on Mathematics, M. Nauka, 1956 L. Bers, Mathematical Analysis, vol. 1, M., Vysshaya Shkola, 1977. A. I. Markushevich, Series, M., Nauka, 1957
Date of last amendment	20.01.2020

Module Name:	**Module 11: Information and Communication Technologies**
Code	M11IS(Ba)
Module Elements:	*Compulsory Subject* Information and Communication Technologies
Semester Number:	3
Person responsible for the module	Y.A. Klishina
Lecturer:	Information and Communication Technologies - Y.A. Klishina
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	3 semester: hours per week – 10 (lectures -1; labs-3; independent work of students -6); hours per semester – 150.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 90 hours Total: 150 hours
Credit Points:	5 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for each subject of the module
Recommended Conditions:	This module is based on the knowledge gained by students in the school course of Informatics and University modules of Foreign Language
Expected Learning Outcomes:	Know: basics and prospects of development of new information technologies, local and global networks. Be able to: create information objects of complex structure. Possess the skills: use of modern software, modern computer technology, communication systems and information transfer. Demonstrate the ability to: develop algorithms and flowcharts for solving problems in the subject area.
Intendend use/applicability	Modules: IT-Infrastructure, Software and Network Engineering
Content:	*Information and Communication Technologies* An ICT role in key sectors of development of society. Introduction to computer systems. Software. Operating systems. Human-computer interaction. Database systems. Data analysis. Data management. Networks and telecommunications. Cyber safety. Internet technologies. Cloud and mobile technologies. Multimedia technologies. Technology Smart. E-technologies. Electronic business. Information technologies in the professional sphere. Prospects of development of ICT.
Examination Form, module mark:	*Information and Communication Technologies* - computer-based testing Module mark: the result of the exam *Information and Communication Technologies*
Technical/Multimedia Facilities:	Multimedia system, IT room with Internet access, educational server of the Department, internal educational network of the University.
Study Materials:	1. Computer Science: Textbook / under the editorship of prof. N.V. Makarova. - M., Finance and Statistics, 2007. 2. Computer Science. Abstract of the Textbook. 2003. 3. Electronic Version. Computer Science: Textbook / under the editorship of prof. N.V. Makarova. - M., Finance and Statistics, 2007. 4. L. S. Voskov. Programming in Visual Basic. 10 printed sheets. Practical Course. 2003. Electronic version.

	5. Computer Science. 4th edition, A. N. Stepanov SPb.- Piter, 2005.
	6. Word. Excel. Internet. E-mail: Official Training Course for European Certification. – M.: Triumph, 2008.
	7. Information Security and Information Protection: a textbook for universities./ V. P. Melnikov, S.A. Kleymenov and A. P. Petrakov; under the editorship of S. A. Kleymenov. – 3rd ed. – Moscow: Akademiya, 2008.
Date of last amendment	20.01.2020

Module Name:	**Module 12: Profound Language Learning**
Code	M12IS(Ba)
Module Elements:	*Compulsory Subjects* Professional Kazakh (Russian) Language Professionally-Oriented Foreign Language
Semester Number:	4
Person responsible for the module	I.A. Olkova
Lecturer:	Professional Kazakh (Russian) Language – D.K. Kuandykova Professionally-Oriented Foreign Language - I.A. Olkova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	4 semester: hours per week – 12 (workshops -4; independent work of students -8); hours per semester – 180.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 120 hours Total: 180 hours
Credit Points:	6 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	The course is designed for students who proceed with learning the languages - Foreign Language and National Language.
Expected Learning Outcomes:	Know: terminological minimal vocabulary focused on the future profession. Be able to: annotate the scientific text, summarize the content of the text and draw conclusions. Possess the skills: working with special texts, reading and translating with a dictionary. Demonstrate the ability to: discuss professionally-oriented topics in Kazakh (Russian) and the foreign language.
Intendend use/applicability	Modules: IT-Infrastructure, Databases in Information Systems, Software and Network Engineering, Information Protection, Business Administration in Information Systems, Artificial Intelligence Systems, IT-Technologies, WEB Designing, Information Systems Software
Content:	*Professional Kazakh (Russian) Language* Constitution of Kazakhstan. human rights and freedoms and a man; Labour law. President. Parliament. Law on Languages. Entrepreneurship in Kazakhstan. Public and private entrepreneurship. Employment. On education. Economic opportunities of Kazakhstan. Kazakhstan and international organizations. Record keeping. *Professionally-Oriented Foreign Language* Improving students' English language skills: improving the skills of speaking, writing, understanding of oral and written speech; the study of the rules of construction of scientific and professional speech, the features of the language of reports and presentations; the study of the basic scientific terms, the consolidation of all major grammatical structures and phenomena.
Examination Form, module mark:	Comprehensive examination including: *Professional Kazakh (Russian) Language - computer-based testing*. *Professionally-Oriented Foreign Language - computer-based testing*.

	Module mark: the result of the exam *Professionally-Oriented Foreign Language*
Technical/Multimedia Facilities:	Language laboratory, interactive whiteboard, AUDIO and video equipment, Internet
Study Materials:	1. D.E. Zemach, L.A.Rumisek. Academic Writing. MacMillan Press, 2006. 2. Key Concepts in Information and Communication Technology (Palgrave) by Roger I. Cartwright. 3.Hawley Roddick, Business Writing Makeovers, AST, Astrel, 2004. 4. A. M. Aldanova, D. K. Akanova. Social and Business Kazakh Language. Almaty, 2002 5. K. Atygayeva, T. Akhmetova. Business Kazakh Language. Petropavlovsk, NKSU. 2010. 6. A. O. Musa, I.M. Tolegenov. Kazakh Language. Almaty, 2003 7. T.A. Sauytova, R.N. Zholdybayeva. Kazakh Language, 2006.
Date of last amendment	20.01.2020

Module Name:	**Module 13: Basics of Information Systems**
Code	M13IS(Ba)
Module Elements	*Compulsory Subject* Basics of information systems
Semester Number:	4
Person responsible for the module	L.V. Dolmatova
Lecturer:	Basics of information systems – L.V. Dolmatova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	4 semester: hours per week – 6 (lectures -1; labs-1; self-study student with the teacher -1; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 30 hours Extracurricular Classes: 60 hours Total: 90 hours
Credit Points:	3 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of the previous undergraduate subjects: Algorithms, Data Structures and Programming, and Mathematics 3.
Expected Learning Outcomes:	*Know:* basic concepts and definitions related to information systems, as well as the collection, transmission, processing and storage of information. *Skills:* build information process models, solve problems of information process optimization. Possess the skills*:* apply the basics of information systems to solve the problems of organizing the optimal collection, storage, transmission and processing of information. Demonstrate the ability to*:* model an information system..
Intendend use/applicability	Modules: Databases in Information Systems, Applied Aspects of Information Systems
Content:	Composition and general structure of information systems. Basic concepts related to information. Modern directions of development of information systems.
Examination Form, module mark:	*Basics of information systems* - Computer-based testing Module mark: the result of the exam *Basics of information systems*
Technical/Multimedia Facilities:	Interactive whiteboard, multimedia system.
Study Materials:	Theory of Information Processes and Systems: Textbook for Students of Universities; ed. B. Y. Sovetov. – Moscow: Akademiya Publishing center, 2010. – 432 p. V. I. Mukhin, S. V. Samoylov. Theory of Information Systems: Textbook - M.: Civil Protection Academy of EMERCOM of Russia, 2012 . – 174 p. ,B. H. Aitchanov, T. V. Yaskevich. Information Theory: Textbook – Almaty: KazNTU, 2009. – 139 p..
Date of last amendment	20.01.2020

Module Name:	**Module 14: Philosophy**
Code	M14IS(Ba)
Module Elements:	*Compulsory Subject* Philosophy
Semester Number:	4
Person responsible for the module	A.V. Nikiforov
Lecturer:	Philosophy - A.V. Nikiforov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	4 semester: hours per week – 10 (lectures -2; workshops -2; independent work of students -6); hours per semester – 150.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 90 hours Total: 150 hours
Credit Points:	5 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for each subject of the module
Recommended Conditions:	The study of the subject is based on the knowledge and skills of students obtained in the following school subjects: Social and Humanitarian Knowledge.
Expected Learning Outcomes:	Know: forms and methods of scientific knowledge. Be able to: seek and apply new approaches to solving various philosophical problems. Possess the skills: defend personal point of view; analysis and logical thinking. Demonstrate ability to: use scientific views in life and profession.
Intendend use/applicability	Modules: Final Internship
Content:	*Philosophy* Formation of understanding of a new type of rationality – as a consequence of the development of private and experimental sciences. Philosophical understanding of different forms of scienticism – mechanistic, cybernetic and synergetic. Identification of close interaction of scienticism with philosophical and anthropological problems, as well as elucidation of the true essence of science, religion, philosophy and art.
Examination Form, module mark:	*Philosophy* - computer-based testing Module mark: the result of the exam *Philosophy*
Technical/Multimedia Facilities:	PowerPoint presentations, electronic texts, multimedia system
Study Materials:	P. V. Alekseyev, A.V. Panin. Philosophy: Textbook. M.: Prospect, 2003 V. D. Gubin. Philosophy: Textbook. M.: Omega, 2006 A. G. Spirkin. Philosophy: Textbook. M.: Gardariki, 2004 Philosophy: Textbook/Comp. T. H. Gabitov, Almaty, 2003 S. F. Denisov. History and Philosophy of Science: Textbook. – Part 2: Science – Religion – Philosophy – Art. – Omsk: Amphora Publishing House, 2010. S. A. Lebedev, V. A. Rubochkin. History of Science. Philosophical and Methodological Analysis. Textbook for Universities. Stamp of the Russian Academy of Education. – Moscow: Publishing house: MPSI, MODEK, 2011
Date of last amendment	20.01.2020

Module Name:	**Module 15: IT-Infrastructure**
Code	M15IS(Ba)
Module Elements:	*Compulsory Subject* IT-Infrastructure
Semester Number:	5
Person responsible for the module	N.V. Astapenko
Lecturer:	IT-Infrastructure - N.V. Astapenko
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	4 semester: hours per week – 10 (lectures -1; workshops -1; labs-2; independent work of students -6); hours per semester – 150.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 90 hours Total: 150 hours
Credit Points:	5 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject of the module
Recommended Conditions:	This module is based on the knowledge gained by students in previous undergraduate subjects: Information and Communication Technologies, Profound Language Learning
Expected Learning Outcomes:	Know: components of IT-infrastructure of different profile and scale; main standards in the field of development and maintenance of IT-infrastructure. Be able to: apply modern technologies of business process modeling, use modern program and algorithmic software in the IT-infrastructure components of different profile and scale. Possess the skills: effective design and support of IT-infrastructure. Demonstrate the ability to: effectively develop and upgrade IT infrastructure.
Intendend use/applicability	Modules: Software and Network Engineering
Content:	*IT-Infrastructure* Formation of understanding of IT-infrastructure. Structure and composition of IT-infrastructure, methodology of IT-infrastructure construction and management. Methods of organization of maintenance and operation of the IT-infrastructure components. Systematic approach in the study, design and exploitation of the IT infrastructure components.
Examination Form, module mark:	*IT-Infrastructure* – written examination Module mark: the result of the exam *IT-Infrastructure*
Technical/Multimedia Facilities:	Multimedia system. IT room.
Study Materials:	IT Service Management, Introduction. Translation into the Russian language under the editorship of M. Y. Pototskiy, M.: Otkrytiye Sistemy, 2003. A. Tanenbaum, M. van Steen. Distributed systems. Principles and Paradigms - SPb.:Piter, 2003. R. B. Vasilyev, G. N. Kalyanov, G. A. Lyovochkina. Management of Information Systems Development. - M.: Goryachaya liniya-Telecom. 2009 A. Newcomer. Web Services. XML, WSDL, SOAP and UDDI. For Professionals: Piter, 2003.

	Terry White. What Business Wants from IT. Strategy of Effective Cooperation between Business Leaders and 1T Directors. 2007
	A. N. Biryukov. Lectures on the Processes of Information Technology Management. M.: Binom, 2010
Date of last amendment	20.01.2020

Module Name:	**Module 16: Databases in Information Systems**
Code	M16IS(Ba)
Module Elements	*Compulsory Subject* Databases in Information Systems
Semester Number:	5
Person responsible for the module	T.V. Pyatkova
Lecturer:	Databases in Information Systems - T.V. Pyatkova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	5 semester: hours per week – 10 (lectures -1; labs-3; independent work of students -6); hours per semester –150.
Workload:	Teaching Load: 60 hours Extracurricular Classes: 90 hours Total: 150 hours
Credit Points:	5 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in previous undergraduate subjects: Database Systems, Basics of Information Systems, Profound Language Learning
Expected Learning Outcomes:	Know the theoretical basics of databases, principles of database development and tools to work with them. Be able to develop databases for solving practical problems; use a systematic approach in the study, design and operation of information systems; develop algorithms for a real systems functioning and implementing them. Possess the skills in database design and development, building a logical database model and physical database model; work in popular DBMS; Demonstrate the ability to work with SQL query language and with DBMS of Visual FoxPro and MS Access.
Intendend use/applicability	Modules: Automation and Designing, Applied Aspects of Information Systems
Content:	*Databases in Information Systems* Database information systems. History of genesis and development of databases. General information about the data. The concept of building a database. Basics of database theory. Theory of relational databases. The integrity of relational data. Relational algebra. Normal forms of relationships. Normal forms of high orders. Database development. Database design. Database design automation. Transactions and database integrity. Database software.
Examination Form, module mark:	*Databases in Information Systems* - written examination Module mark: the result of the exam *Databases in Information Systems*
Technical/Multimedia Facilities:	Multimedia system. IT room.
Study Materials:	G. A. Miroshnichenko Relational Databases: Practical Methods of Optimal Solutions. - SPb: BHV, 2015. - 400 p.: with pictures V. Y. Tumanov. Basics of Relational Database Design: Textbook. - M.: Binom, 2008. - 420 p.: with pictures K. Henderson. Professional guide to SQL. SPb: Piter, 2015 – 620 p.

	A.D. Khomonenko, V. M. Tsygankov, M. G Maltsev. Databases: Textbook for Higher Education Institutions. M.: Binom-Press, 2012 – 736 p.
	S. N. Semkin, A. N. Semkin. Basics of Information Security of Information Processing Facilities. – Moscow: Akademiya Publishing center, 2013. – 432 p.
	P. N. Devyanin, O. O. Michalskiy et al. Comprehensive Information Protection in Computer Systems. Yekaterinburg, 2013. – 132c.
	O.R. Laponina. Theoretical Basics of Computer Security: Textbook for Universities – Moscow : TELEKOM, 2014. – 180 p.
	Y.V. Shevchuk, N. S. Kolyeva. Programming in C++. - Almaty: Evero, 2014. - 272 p.,
Date of last amendment	20.01.2020

Module Name:	**Module 17: Final Internship**
Code	M17IS(Ba)
Module Elements:	*Compulsory Subjects* Work Experience Internship 3 Pre-Graduation Internship
Semester Number:	8
Person responsible for the module	Y.V. Kukharenko
Lecturer:	Work Experience Internship 3 – Y.V. Kukharenko Pre-Graduation Internship – Y.V. Kukharenko
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	8 semester: Work Experience Internship 3 – 300 hours. Pre-Graduation Internship – 150 hours.
Workload:	Extracurricular Classes: 450 hours Total: 450 hours
Credit Points:	15 ECTS
Conditions for Examinations:	For admission to the final control, the student must complete the internship program in full
Recommended Conditions:	Completion of theoretical training on the degree programme
Expected Learning Outcomes:	Know: the methodology of analysis of the organization, the basics of working relations and management principles, taking into account technical, financial and human factors; data structure and samples of problem solving, including central programming paradigms; Be able to: formalize the subject area of the project and the requirements of the customer's users and to program using modern tools. Possess the skills: use various techniques to develop efficient and reliable algorithms to create software; Demonstrate the ability of: modeling, analysis and use of mathematical methods of design and logical-mathematical methods of analysis and software testing.
Intendend use/applicability	Modules: Final Academic Assessment
Content:	*1.Work Experience Internship 3* Be able to formalize the subject area of the project and the requirements of the customer's users according to the results of the express survey, to develop solutions to identified business problems based on the results of the express survey. Programming using modern programming languages. *2.Pre-Graduation Internship* Program settings for automation of unique accounting needs; design, development and testing of problem-oriented Web-resources. Analysis of the subject area and assessment of costs for design and development of the software.
Examination Form, module mark:	*Work Experience Internship 3* – report defense *Pre-Graduation Internship* - report defense. Module mark: the result of the exam *Pre-Graduation Internship*
Technical/Multimedia Facilities:	Working equipment of the places of internship, laboratory equipment of the Department.
Study Materials:	T. V. Gvozdeva. Design of Information Systems: Textbook / T. V. Gvozdeva, B. A. Ballod. – Rostov-on-Don: Phoenix, 2009. -508 p.

	Methodology of Computer-Aided Information Systems Design: Basics of System Approach/ V. G. Ovchinnikov. - Moscow : Sputnik+, 2005. - 285 p. - ISBN 5-364-00067-2
	Greg Riccardi. Database System. Theory and Practice of Using the Internet and Java / Riccardi, G. - M. : Williams, 2012. - 480 p. - ISBN 5-8459-0208-8, 0-201-61247-X
	Luke Welling, Laura Thomson. Development of web-applications using PHP and MySQL. - St. Petersburg, Williams, 2010, 848 p. - ISBN 978-5-8459-1574-0
	Organization Management: Textbook / ed. by: A. G. Porshnev, Z. P. Rumyantsev, N. A. Salomatin. - 2nd ed., updated and revised - M.: INFRA-M, 1999. - 669 p. - ISBN 5-86225-725-k
	V. V. Godin. Information Resources Management: 17-Module Program for Managers. Company Development Management. Module 17 / V. V. Godin, I. K. Korneyev. - M. : Infra-M, 2000. - 352 p. - ISBN 5-16-000291-X
Date of last amendment	20.01.2020

Module Name:	**Module 18: Final Academic Assessment**
Code	M18IS(Ba)
Module Elements:	*Compulsory Subjects* State examination in the specialty Developing and defending a thesis
Semester Number:	8
Person responsible for the module	Y.V. Kukharenko
Lecturer:	State examination in the specialty – Y.V. Kukharenko Developing and defending a thesis – Y.V. Kukharenko
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	8 semester: hours per semester – 450.
Workload:	Extracurricular Classes: 450 hours Total: 450 hours
Credit Points:	15 ECTS
Conditions for Examinations:	Completion of the Degree Programme and writing a bachelor's thesis
Recommended Conditions:	Completion of the full course of study on the Degree Programme
Expected Learning Outcomes:	Know: theoretical basics of main and major subjects; modern achievements in the field of production, transmission and distribution of electricity and power supply of enterprises according to the industries; methods of analysis and synthesis of information systems in the chosen field and the principles of their construction and operation. Be able to: apply the knowledge gained in practice; to present in writing or orally own ideas and solutions to problems; to calculate and design the main components of the systems; to formulate the basic technical and economic requirements for the designed information systems. Possess the skills: use of software for calculations, modeling and implementation of production processes; evaluation of reliability and competitiveness of the software; work in groups to create projects. Demonstrate the ability to: apply knowledge and skills in professional activities, in the design of information systems and in the analysis and synthesis of information systems models.
Intendend use/applicability	
Content:	*1.State examination in the specialty* Determination of the compliance of the graduates' level with the requirements of the educational standard. At the same time, both theoretical knowledge and practical skills of the graduate are tested in accordance with the specialty 5B070300 Information systems. *2. Developing and defending a thesis* As the final stage of training students in higher education, the thesis has the following objectives: systematization, consolidation and expansion of theoretical knowledge and practical skills in the specialty and their application in solving specific scientific problems, as well as cultural tasks; development of skills of independent work and mastering the methodology of research and experimentation in solving problems and issues developed in the thesis; clarification of readiness for independent work in the conditions of modern

	production, science, technology and culture according to the target direction
Examination Form, module mark:	Comprehensive module examination including *State examination in the specialty* – written examination *Developing and defending a thesis* – defending a bachelor's thesis
Technical/Multimedia Facilities:	Software development tools environment, database management systems, office software packages.
Study Materials:	V. A. Ostreykovskiy. Theory of Systems, M. 2007; Y. A. Schreider, A. A. Sharov. Systems and Models, M. 2012; B. I. Kudrin. Introduction to Technetics. Tomsk: 2003. V.P. Agaltsev. Databases: Textbook. M., Mir, 2002.-376 p.; S. V. Glushakov, D. V. Lomotko. Databases: Training Course. M., AST, 2000.-504 p.; pictures of D. Artyomov. Microsoft SQL Server 2000. Latest technology. M.: Russian edition, 2001.-576 p.; R. Riordan. Basics of Relational Databases. M.: Russian edition, 2001-384 p.; Databases and Knowledge Bases Management System: Reference Guide/ A. N. Naumov, A. M. Vendrov. M.: Finance and Statistics, 1991-352 p. L. I. Aksenova, L. V. Igoshina. Algorithmic Languages and Programming. Methodical Instructions to Laboratory and Individual Works. – Penza, 2000. – 139p. N. Wirth. Algorithms + Data Structures = Programs.- M.: Mir, 1985 Y. P. Lilitko. Practical Course on Programming. Beginners. - Pereyaslavl-Zalesskiy, 1997 Лилитко Е.П. Практикум по программированию.
Date of last amendment	20.01.2020

Module Name:	**Module 19: Basics of the Profession** (Elective Modul 1, EM1)
Code	M19IS(Ba)
Module Elements:	*Elective Subjects* Programming Technics/Software Programming Languages Introduction to the Profession/Introduction to the Specialty Practical Training 1, 2
Semester Number:	1, 2
Person responsible for the module	N.V. Astapenko
Lecturer:	Programming Technics – L.V. Dolmatova Software Programming Languages – N.V. Astapenko Introduction to the Profession – V.P. Kulikov Introduction to the Specialty – V.P. Kulikov. Practical Training 1,2 – N.V. Astapenko
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	1 semester: hours per week – 10 (lectures -1; labs-3; independent work of students -6); hours per semester – 150. 2 semester: hours per week – 6 (lectures -1; workshops -1; labs-2; independent work of students -6); hours per semester –90. Practical Training 1,2: 60 hours.
Workload:	Teaching Load: 90 hours. Extracurricular Classes: 150 hours. Practical Training 1,2: 60 hours. Total: 300 hours
Credit Points:	10 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	-
Expected Learning Outcomes:	Know spheres, objects, subjects and types of professional activity of the bachelor of specialty 5B070300 – Information Systems; perspective directions of development of the specialty; prospects of development of power industry. Be able to successfully participate in the educational process in accordance with the approved working curriculum of the specialty. Possess the skills: use knowledge on the power industry in the further study of special subjects. Demonstrate the ability to: t understand the requirements for the qualification level and competence, and basic information about the professional activities of the bachelor specialty of 5B070300 Information Systems.
Intendend use/applicability	Modules: Databases and Information Protection, Software and Network Engineering
Content:	*Programming Technics* Basics of algorithmization, methods of recording algorithms, basics of programming technology, programming style, structure of programs, methods of debugging and testing programs, data types, general information on object-oriented programming. *Software Programming Languages* Learning of the classification of programming languages, data types, operations, operators of C++ programming language, program development using subroutines, standard modules, programming style, programming quality indicators, methods

	of debugging and testing programs, basics of object-oriented programming, memory and addressing, program development using pointers, programming features in C++.
	Introduction to the Profession
	Characteristics of professional activity of graduates under the degree programme in the specialty. Requirements for the level of qualification and competence of the bachelor. Electric power industry is the leading component of energy. History of electronics development, its role in modern scientific and technical progress. A brief historical overview of the development of electrical equipment. Application of nanotechnology in the modern world.
	Introduction to the Specialty
	Sphere, objects, subjects and types of professional activity of the bachelor in the specialty of 5B071800 – Electrical Power Engineering. Promising areas in the field of electrical power engineering. Equipment, technologies of production of the main enterprises and their technical and economic indicators.
	Practical Training 1,2
	Consolidation and deepening of primary professional knowledge and skills obtained in theoretical training, preparation for the study of special subjects of the curriculum, the formation of students' general ideas about the possibilities of using computer technology in industrial, administrative and economic activities.
Examination Form, module mark:	Comprehensive module examination including
	Programming Technics/Software Programming Languages – written examination
	Introduction to the Profession/Introduction to the Specialty – computer-based testing
	Practical Training 1,2 – Programming Report Defence
	Module mark: the result of the exam *Practical Training 2*
Technical/Multimedia Facilities:	Multimedia System.
	IT room.
Study Materials:	N. A. Litvinenko. C++Programming Technology. Beginners //St. Petersburg 2009, BHV
	M. V. Kuznetsov. C++ Master Class in Problems and Examples //St. Petersburg 2010, BHV
	H. Schildt C++ : Basic Course / H. Schildt - 3rd ed. - M. : William, 2011. - 620 p.: with pictures
	Basics of Digital Technology, O. P. Novozhilov, 2014, Moscow, IE RadioSoft
	Computer Systems, Networks and Telecommunications, V. L., Broydo 2014, St. Petersburg, Piter\
Date of last amendment	20.01.2020

Module Name:	**Module 20: Technologies of Technogenic Risk Management** (Elective Modul 2, EM2)
Code	M20IS(Ba)
Module Elements:	*Elective Subjects* Basics of Law and Anti-Corruption Culture/Basics of Financial Literacy/Economic and Business Studies/ Power Saving Technologies in Modern Industries/Ecology and Sustainable Development/Information and Quality Management/Health and Safety Basics
Semester Number:	4
Person responsible for the module	T.P. Kovshova
Lecturer:	Basics of Law and Anti-Corruption Culture – Y.A. Bryzgalova Basics of Financial Literacy – O.A. Tsapova Economic and Business Studies – I.A. Shinkaryov Power Saving Technologies in Modern Industries – V.V. Savinkin Ecology and Sustainable Development – S.B.Baybusinova Information and Quality Management – T.P. Kovshova Health and Safety Basics – T.S. Zvyarechenko
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	4 semester: hours per week – 6 (lectures -1; workshops -1; independent work of students -4); hours per semester – 90.
Workload:	Teaching Load: 30 hours Extracurricular Classes: 60 hours Total: 90 hours
Credit Points:	3 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained in the course of the secondary school subjects: Geography; Health and Safety Basics; People. Society. Rights.
Expected Learning Outcomes:	Know: theoretical foundations and basic concepts of humanitarian, economic and natural sciences, information and communication technologies that contribute to the formation of a highly educated person with a broad outlook and culture of thinking; Be able to: use humanitarian, economic, legal and natural science knowledge in the modern information space; Possess the skills: search, analysis, evaluation, work with sources and use of humanitarian, economic, legal and natural science knowledge for personal and professional development; Demonstrate the ability to: use the tool of historical analysis, knowledge of information and communication technologies for better solutions of professional problems, the basics of philosophical knowledge for the formation of scientific worldview and economic thinking to solve situational and practical problems.
Intendend use/applicability	Modules: Data Management and Knowledge Systems
Content:	*Basics of Law and Anti-Corruption Culture* Basics of constitutional, criminal, administrative, labour and family law of the Republic of Kazakhstan. Theoretical and methodological basis of the concept of corruption. *Basics of Financial Literacy*

	Planning of capital investments and cash flows. Long-term and short-term sources of funding. *Economic and Business Studies* Introduction to Economics. Entrepreneurship and business. Money circulation and turnover. Functioning of markets. Business planning. *Power Saving Technologies in Modern Industries* Power industry, energy saving and energy resources. Types, methods of production, conversion and use of energy. Energy management. *Ecology and Sustainable Development* Ecology of individuals, populations and communities. The concept and principles of sustainable development. *Information and Quality Management* Elements of organizations and management process. Basics of quality management. Information management – basic concepts. *Health and Safety Basics* Legislative and legal acts in the field of safety and life. Protection of people and environment from harmful and dangerous factors of natural and man-made origin. Classification of hazardous and harmful factors.
Examination Form, module mark:	*Basics of Law and Anti-Corruption Culture /Basics of Financial Literacy /Economic and Business Studies / Power Saving Technologies in Modern Industries / Ecology and Sustainable Development /Information and Quality Management /Health and Safety Basics* – computer-based testing Module mark: the result of the exam *Basics of Law and Anti-Corruption Culture /Basics of Financial Literacy /Economic and Business Studies / Power Saving Technologies in Modern Industries / Ecology and Sustainable Development /Information and Quality Management /Health and Safety Basics*
Technical/Multimedia Facilities:	Multimedia System.
Study Materials:	1. K. S. Birzhanova, K. B Ibrayeva. Basics of Law of the Republic of Kazakhstan. - Almaty: Almaty kitap baspasy, 2013. 2. R. Y. Dzhanshanlo. Analysis of Cash Flows of the Organization: Textbook / R. Y. Dzhanshanlo. - Almaty: Lem, 2015. 3. Y. F Borisov, A. A. Petrov, T. Y. Berezkina. Economics: Textbook for Bachelors. - M.: Prospekt, 2013. 4. Fundamentals of Energy Conservation: Textbook / N.I. Danilov, Y. M. Schelokov. Yekaterinburg: GOU VPO UGTU - UPI, 2015. 5. T. A. Hwang, P. A. Hwang. Ecology: Short Course. - Rostov-on-Don: Phoenix, 2012. 6. A.V. Kostrov. Basics of Information Management: Textbook M.: Finance and Statistics, 2008. 7. Y. D. Vishnyakov. Life Safety. Protection of Population and Territories in Emergency Situations: Textbook. - M: Akademiya, 2012.
Date of last amendment	20.01.2020

Module Name:	**Module 21: Data Management and Knowledge Systems (Elective Modul 3, EM3)**
Code	M21IS(Ba)
Module Elements	*Elective Subjects* Database Systems Databases and Knowledge Bases Programs and Means of Information Protection Reliability of Information Systems Systems Analysis and Simulation System analysis Business Process Modeling Work Experience Internship 1
Semester Number:	3
Person responsible for the module	V.P. Kulikov
Lecturer:	Database Systems – T.V. Pyatkova Databases and Knowledge Bases – V.P. Kulikov Programs and Means of Information Protection – Y.V. Kukharenko Reliability of Information Systems – V.P. Kulikov Systems Analysis and Simulation – V.P. Kulikov System analysis – V.P. Kulikova Work Experience Internship 1 - T.V. Pyatkova Business Process Modeling- T.V. Pyatkova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	3 semester: hours per week – 22 (lectures -2; labs-6; independent work of students -14); hours per semester – 330. 4 semester: hours per week – 10 (lectures -1; workshops -1; labs-2; independent work of students -6); Work Experience Internship 1 - 60 hours hours per semester –210.
Workload:	Teaching Load: 180 hours Extracurricular Classes: 270 hours Total: 540 hours
Credit Points:	18 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of the previous undergraduate subjects: Basics of the Profession, Programing Basics, Mathematics 3, Reliability of Information Systems, Database Systems, Databases and Knowledge Bases, Programs and Means of Information Protection, Technologies of Technogenic Risk Management.
Expected Learning Outcomes:	Know: different approaches to the organization of databases; relational database model; the concept of database; the concept of database systems; database models; modern methods of processing, transformation and protection of information in modern computer systems; modern ways to combat unauthorized blocking, access, copying, modification and collection of information. Know: problem statement, modeling stages; construction of economic and mathematical models for decision-making problems in difficult situations or under uncertainty. .Know the main problems of the modern theory of business processes, the principles of organization structuring, modern features and

	instrumental systems used to describe business processes, the basic principles of business process analysis.
	Be able to: perform operations of relational algebra and relational calculus; design databases; use the basic principles, methods and algorithms for the operation of software systems for collecting, closing, restoring and authenticating information.
	Be able to: independently investigate the problem of decision-making; possess the skills of choice and implementation of the algorithm solutions and research in various fields of human activity Be able to explore the theory of the technological approach to managing the activities of an organization, the methodology for describing business processes and their supporting software.
	Possess the skills: building a logical database model, a physical database model; working in popular DBMS; working with SQL query language; working with DBMS of Visual FoxPro and MS Access; creating information security systems, as well as optimizing models of comprehensive business processes; independent use of appropriate software tools.
	Possess the skills: in the field of economic and mathematical models for decision-making problems. have the skills to work in modern instrumental systems.
	Demonstrate the ability to: perform the database design process; in the technology of access to data from client applications; understanding information technologies and their security, as well as information resource management.
	Demonstrate the ability to: apply typical models in economic analysis and planning at different levels of the economy.
	Demonstrate the ability to visualize business processes, analyze business processes.
Intendend use/applicability	Modules: Automation and Designing
Content:	*1.Database Systems* Information Systems database. General information about the data. The concept of building a database. Basics of database theory. Theory of relational databases. The integrity of relational data. Relational algebra. Normal forms of relationships. Normal forms of high orders. Database development. Database design. Database design automation. Transactions and database integrity. Database software. *2.Databases and Knowledge Bases* Development of database technology. DBMS. Information systems using databases. Relational database management: relational algebra and relational calculus. Relational database management: SQL. Client/server technology. Relational DB management. Database administration and control. *3.Programs and Means of Information Protection* The problem of information protection. Purpose and necessity of closing information. Objects of protection, directions of information protection, its methods and means. General problem of information security of information systems. Protection of information within information processes. Protection of information from unauthorized access. Mathematical and methodical means of protection. *4.Reliability of Information Systems* Reliability: basic concepts and definitions. Reliability index. Main indicators of reliability of objects. Probability of failure.

	Mean time to failure. Failure rate. Mean time between failures. Parameters of the failure thread. Main indicators of durability. *Systems Analysis and Simulation / System analysis.* General and canonical statements of LPP (linear programming problems). Geometric method for solving LPP. An algebraic simplex method for solving LPP. The dual problem of LP. Dual simplex method. Regression model. Nonlinear model. Dynamic systems: examples of dynamic models. Dynamic systems: evaluation of the quality of dynamic models, modeling of dynamic objects. Statistical modeling. Monte Carlo method. RNG methods. Simulation of a queuing system. Planning and management problems. Game theory: strategies in the game. The loss function, the price of the game. S - game. Minimax theorem. Game theory: reduction to the problem of LP, statistical games. Game theory: non-coalition games, non-antagonistic games. Decision theory: problems, models. The decision theory: criteria for decision of Minimal risk, Savage, Bayes-Laplace, Hurwitz, etc. Queuing Theory and inventory management. *Business Process Modeling* A discipline that studies the concept of a business process, a process approach and a process-oriented organization, the theoretical foundations of business process management, the main approaches and standards for business process modeling, business process modeling software, methods for describing various subject areas of an organization, methods for analyzing business processes. processes. *Work Experience Internship 1* Optimal control. Methods and models of graph theory. The problem of constructing the shortest path and Dijkstra's method. Flows in networks and the principles of conservation. Network modeling problems.
Examination Form, module mark:	*Database Systems /Databases and Knowledge Bases –* computer-based testing *Programs and Means of Information Protection / Reliability of Information Systems/ Business Process Modeling* – written examination *Systems Analysis and Simulation / System analysis.* - course paper *Work Experience Internship 1* - report defense
Technical/Multimedia Facilities:	Multimedia System. IT room.
Study Materials:	Y. K. Baranova. Simulation of Information Security System. Practical Course: Textbook for university students. - M. : RIOR : INFRA-M, 2015. 120 p. V. V. Platonov Software and Hardware Means for Information Protection: Textbook for university students studying Information Safety- 2nd ed., - M.: Akademiya, 2015. - 336 p. Technical Means and Methods of Information Protection: Textbook for universities / A. P. Zaitsev, A. A. Shelupanov, R. V. Meshcheryakov et al.; ed. A. P. Zaitsev and A. A. Shelupanov. – M.: Mashinostroyeniye Publishing House, 2016 – 508 p. A.D. Khomonenko, V. M. Tsygankov, M. G. Maltsev Databases: Textbook for Higher Education Institutions. M.: Binom-Press, 2010 – 736 p.

	K. J. Date. Introduction to Database Systems M: SPb.: Williams Publishing House, 2012. – 848 p. V. K. Morozov, G. N Rogachev. Simulation of Information and Dynamic Systems; Akademiya - Moscow, 2011. - 384 p. B. Y. Sovetov, S. A. Yakovlev. Simulation of Systems. Textbook for universities. – Moscow: Vysshaya Shkola, 2013. N. G. Chikurov Simulation of Systems and Processes; RIOR, Infra-M - Moscow, 2013. - 400 p. N. V. Golubeva. Mathematical Simulation of Systems and Processes; Lan - Moscow, 2013. - 192 p Dolganova, O. I., Vinogradova E. V., Lobanova A. M. Business process modeling: textbook and workshop for academic undergraduate students; edited by O. I. Dolganova. - Moscow: Yurayt Publishing House, 2019. - 289 p. Garaedagi J. Systems thinking: How to manage chaos and complex processes: a platform for modeling business architecture, - Minsk: Grevtsov Publisher, 2007, - 480p. Menkov A.V., Ostreykovsky V.A. Theoretical foundations of automated control // Textbook for universities - M .: Oniks, 2011 - 640 p.
Date of last amendment	20.01.2023

Module Name:	**Module 22: Automation and Designing (Elective Modul 4, EM4)**
Code	M23IS(Ba)
Module Elements	*Elective Subjects* Accounting in Information Systems / Multimedia Technologies and Animation Graphics / Design of Information Systems Financial Activities Automation / Metrology, Standardization and Certification in Information and Communication / Architecture of Computers and Systems
Semester Number:	3,4
Person responsible for the module	O.A. Nikishina
Lecturer:	Accounting in Information Systems – O.A. Nikishina Multimedia Technologies and Animation Graphics – N.V. Astapenko Design of Information Systems – Y.V. Ushakova Financial Activities Automation – O.A. Nikishina Metrology, Standardization and Certification in Information and Communication – Y.V. Ushakova Architecture of Computers and Systems – V.P. Kulikov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	3 semester: hours per week – 14 (lectures -1; labs-4; independent work of students -9); hours per semester – 210. 4 semester: hours per week – 8 (lectures -1; labs-2; independent work of students -5); hours per semester – 120.
Workload:	Teaching Load: 120 hours Extracurricular Classes: 210 hours Total: 330 hours
Credit Points:	11 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of previous undergraduate subjects: Analysis and Simulation of Systems, Databases in Information Systems.
Expected Learning Outcomes:	Know the basic principles of management of information projects; basic approaches, methods and models of quality management systems of information projects; principles of functioning of information systems and the basics of accounting; types of multimedia products; formats of dynamic data; multimedia technologies for working with dynamic content of software products. Be able to use a systematic approach in the study, design and development of algorithms for the functioning of projects; to apply the approaches, methods and models of quality management systems in practice; to economically justify solutions in the field of quality of information systems; to understand software and hardware of multimedia technologies and to apply it in solving professional problems. Possess the skills of using existing standards and certification systems in practice; to determine and measure the cost of quality with the achieved level of quality; to solve problems associated with the use and prospects of information technology in the implementation of accounting; input, storage,

	processing, transmission and publication of digital information, including sound, images, video and multimedia products on a personal computer and global computer networks. Demonstrate the ability to work with software processing industry information; storage and demonstration of dynamic content of software products.
Intendend use/applicability	Modules: Information Protection, Software and Network Engineering
Content:	*1.Accounting in Information Systems* Basic principles of development and modification of application solutions on 1C: Enterprise. *2.Multimedia Technologies and Animation Graphics* Theoretical and practical comprehensive consideration of the theory of modern multimedia technologies; composition of multimedia and using them; information technologies using computer animation. *3.Design of Information Systems* Theoretical and practical aspects of designing applications of information systems, the choice of structure and set of software components that implement the requirements for the information system, the study of modern information systems of various types. *4. Financial Activities Automation* Theoretical and practical aspects of the technology of computer processing of accounting information and obtaining financial results. The main areas of accounting (accounting for production and commercial costs, material costs, payroll, fixed assets, intangible assets, accounting materials, services), business process diagrams and document functions with summing up economic activities and analyzing the results. *5. Metrology, Standardization and Certification in Information and Communication* Basics of Metrology as a science of measurement and its role in improving the efficiency of scientific research and the creation of new information and communication technologies. The basic concepts of Metrology, methods and measuring instruments, standards of basic units of electrical quantities. Basics of the errors theory and statistical processing of measurement results. *6. Architecture of Computers and Systems* Operation and maintenance of facilities and equipment containing modern computer tools
Examination Form, module mark:	Comprehensive module examination including: *Accounting in Information Systems / Multimedia Technologies and Animation Graphics / Design of Information Systems.* - computer-based testing *Financial Activities Automation / Metrology, Standardization and Certification in Information and Communication / Architecture of Computers and Systems* – written examination Module mark: the result of the exam *Financial Activities Automation / Metrology, Standardization and Certification in Information and Communication / Architecture of Computers and Systems*
Technical/Multimedia Facilities:	Multimedia System. IT room
Study Materials:	Radchenko 1C Enterprise 8.2 Fast Facts, –M.: 1C Publishing LLC, 2014.

	Y. Alexandrova. 1C: Accounting 8.1 from Scratch! Book+Video Course (+CD), Publishing Houser: Luchshiye Knigi, 2015 S. Kharitonov. Accounting and Tax Accounting in 1C:Accounting 8, Publishing House: 1C-Publishing LLC, 2015. S. A. Orlov. Technologies of Software Development: Textbook, 2014 A. S. Varakin. AutoCAD. Professional work. M.: Williams Publishing House, 2006. – 1040 p.: with pictures
Date of last amendment	20.01.2020

Module Name:	**Module 23: Information Protection, Software and Network Engineering (Elective Modul 5, EM5)**
Code	M24IS(Ba)
Module Elements	*Elective Subjects* Operating Systems and System Programming System and Application Software Computer Networks Information Transmission Systems and Networks WEB-Programming Client-Server Applications Designing Graphic Means of Information Systems Information Technologies of Visualization Information Security Information Protection IT security of distributed IS
Semester Number:	5,6
Person responsible for the module	I.R. Kasimov
Lecturer:	Operating Systems and System Programming – I.R. Kasimov System and Application Software – V.P. Kulikov Computer Networks – I.R. Kasimov Information Transmission Systems and Networks – V.P. Kulikov WEB-Programming – N.V. Astapenko Client-Server Applications Designing – T.V. Pyatkova Graphic Means of Information Systems – N.V. Astapenko Information Technologies of Visualization – T.V. Pyatkova Information Security – Y.V. Kukharenko Information Protection – V.P. Kulikov IT security of distributed IS– V.P. Kulikov
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	5 semester: hours per week – 40 (lectures -3; workshops -1; labs-10; independent work of students -26); hours per semester – 600. 6 semester: hours per week – 20 (lectures -2; workshops -1; labs-3; independent work of students -14); hours per semester – 300.
Workload:	Teaching Load: 200 hours Extracurricular Classes: 400 hours Total: 600 hours
Credit Points:	26 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of previous undergraduate subjects: Information and Communication Technologies, IT-Infrastructure, Basics of the Profession, Profound Language Learning. Operating Systems and System Programming, System and Application Software, Profound Language Learning
Expected Learning Outcomes:	Know the OS structure, planning, management, deployment, including Shell options; data security issues, interaction with global and local resources, disk systems; information exchange standards in networks, methods of network configuration and testing. Know: the basic definitions and concepts of Web-design and Web-programming, the basic techniques of creating and

	promoting sites; the main hardware components of the computer graphics station, their general characteristics; types of computer graphics, their applications; main features and characteristics of computer graphics software. Know modern methods of processing, transformation and protection of information in modern computer systems; modern methods of combating unauthorized blocking, access, copying, modification and collection of information. Know the features of developing threat models and intruder models in distributed information systems, the most common automated systems for working in distributed information systems and the features of their functioning. Be able to: develop and promote problem-oriented Web-resources; apply methods of design, development and marketing of problem-oriented Web-resources; create raster and vector images; create three-dimensional images. Be able to use Shell languages, registry management tools and policies to solve OS configuration problems; configure the user's network workstation, configure network equipment settings. Be able to use the basic principles, methods and algorithms of operation of software systems for collecting, closing, restoring and authenticating information. Be able to model threats in distributed information systems, make an informed choice and presentation of automated systems to solve specific problems in distributed information systems, taking into account information security requirements. Possess the skills to use the function from the point of view of a user, administrator, programmer and designer; use the skills to organize local networks of different topologies Possess the skills of: design, development and marketing of problem-oriented Web-resources; work with graphic libraries and modern graphic packages and systems. Possess the skills of understanding information technologies and ensuring their safety. Possess practical skills of searching for information leaks andharmful impact in distributed information systems, skills in automated systems serving distributed information systems. Demonstrate the ability to gain insight into the concept of operating systems; understanding the manipulation of memory, threads, processes, software synchronization and virtualization tools; manipulating the parameters of program access to the network. Demonstrate the ability to: understanding the problems, trends and prospects of Web-design and Web-programming; knowledge of raster, vector, fractal graphics, mathematical foundations of machine graphics, two-dimensional, three-dimensional transformations and projections. Demonstrate the ability to manage information resources.
Intendend use/applicability	Modules: Artificial Intelligence Systems
Content:	*1. Operating Systems and System Programming* Mastering the knowledge and skills of using modern software, familiarization with effective algorithms for solving various scientific and technical problems. The subject is devoted to teaching students the structure of a computer system, the concept, the development evolution, functions, approaches to the construction of the OS, the concept, state, model of

	processes representation, operations performed on them; file structure, organization and access to files; composition and concept, main components of the system software, general description of the ASM language, data types, design programs, command recording formats, compilation, modular design, assembly and addressing modes.
	2.System and Application Software
	Understanding the operation of the OS at the level of manipulation of processes and threads, using the capabilities of the shell OS, API OS, BIOS, UEFI and application software. The subject is devoted to teaching students the structure of a computer system, the concept, the development evolution, functions, approaches to the OS construction, the concept, state, model of processes representation, operations performed; file structure, organization and access to files; composition and concept, and main components of the system software, general description of the ASM language, data types, design programs, command recording formats, compilation, modular design, assembly and addressing modes.
	3.Computer Networks
	Mastering the principles of organization and functioning of computer networks, features of the personal computer in networks.
	4.Information Transmission Systems and Networks
	Classification of topological elements in the networks. Methods of access to the transmission medium. The basic model of the organization of open systems interaction (OSI model). Operating systems of peer-to-peer computer networks. Network operating systems with dedicated server.
	WEB-Programming
	Web-Programming is designed to promote students 'familiarity with computer telecommunications and possible approaches to the development of hypertext documents intended for publication in the global computer network of Internet. Training in the development of Web-pages on the basis of an integrated approach; training in Internet programming on the client and server side; training in the use of databases in the development of Web-projects; training in methods of marketing on the Internet, advertising and promotion of developed Internet-resources.
	2. Client-Server Applications Designing
	Principles of development of Internet applications. Basics of site building (introduction to the technology of creating web sites, HTML language). Principles of database design. Methods of connecting Internet pages to the developed database.
	3. Graphic Means of Information Systems
	Basics of working with graphic devices. Basic algorithms of computational geometry and computer graphics. Principles of use of modern graphic systems. Mastering the principles of computer graphics.
	4. Information Technologies of Visualization
	Types of computer graphics. Graphic editors. Basics of working with graphic devices. Basic algorithms of computational geometry and computer graphics. Principles of use of modern graphic systems. Mastering the principles of computer graphics, as well as the current state and prospects for the development of interactive computer graphics.

	Information Security, Information Protection
	Principles, methods and means of implementing data protection. Protection of information in information systems. The current state of the problem of storage, processing, search, transmission, transformation, closure and recovery of confidential information in organizations and enterprises of various activities and different forms of ownership. Methods of protection against unauthorized access.
	IT security of distributed IS
	The concept of a distributed system. Advantages and disadvantagesdistributed systems. Scalability. Transparency. integrity and replication. Hardware and software for building distributed systems. Distributed databases. Data integrity. Location transparency. Processing of distributed requests. Organization of a secure communication channel between the client and the server. Basic network security mechanisms. Identification and authentication. Logging and auditing. Message integrity and confidentiality.
Examination Form, module mark:	Comprehensive module examination including: *Operating Systems and System Programming / System and Application Software* – written examination *Computer Networks / Information Transmission Systems and Networks* – computer-based testing *WEB-Programming / Client-Server Applications Designing* – course paper *Graphic Means of Information Systems/ Information Technologies of Visualization* – written examination *Information Security /Information Protection/ IT security of distributed IS* –computer-based testing
Technical/Multimedia Facilities:	Multimedia System. IT room
Study Materials:	A. Tanenbaum. Modern Operating Systems, Col.: Piter, 2010. System Software, A. V. Gordeyev, A. Y. Molchanov. Piter,2013 Assembly Language for IBM PC by P. Norton, Moscow, Computer Publishing House, 2010 V. L. Broydo. Computer Systems, Networks and Telecommunications. Piter, 2014 V. G. Olifer, N. A. Olifer. Computer Networks. Moscow, 2010 M. Palmer, R. Sinclair. Design and Implementation of Computer Networks. St. Petersburg, 2011 Krista Anderson, Mark Minasi. Local Networks. Kyiv, 2011 V. Dunayev. PHP. Tutorial. SPb. Piter, 2007-284 p. D. Sklyar, A.Trachtenberg. PHP. Programming Recipes. 2nd ed.: Trans. from English, M.: Russkaya Redaktsiya Publishing House, 2007 – 736 p. L. D. Sleptsova, Y. M. Bidasyuk. JavaScript. Tutorial. M.: Williams Publishing house, 2007 – 448 p. Computer Graphics: Textbook / P. Pantyukhin. – M.: Forum, 2010 - . P. 2 / A. Bykov, A. Repinskaya. - 64 p.: with pictures Engineering and Computer Graphics .General Rules for Functional Diagrams Execution: Textbook / A. Dinasylov, E. Yakhyayev, M. Mukashev. - Almaty : AIES, 2009 1. V. V. Baklanov. Introduction to Information Security. Models and Strategies of Information Security: Textbook.

	Yekaterinburg, Publishing House of Ural State University. 2016 - 236 p. 2. V. S. Barsukov. Information Security. M: TEK, 2016 3. S. P. Rastorguyev. Software Methods of Information Protection in Computers and Networks - M.: Yachtsman, 2013, 187 p. 4. D. McNamara. Secrets of Computer Espionage: Tactics and Countermeasures/Trans. from English; Under the editorship of S. M. Malyavko. –M.: BINOM. Laboratoriya znaniy, 2014. - 536 p. 1. Methodological foundations for building secure automated systems [Electronic resource]: tutorial / A.V. Dushkin [et al.]. Electron. text data. - Voronezh: Voronezh State University of Engineering Technologies, 2013. - 260 p. 2. Karpov V.V. Technology for building secure automated systems tutorial / Karpov V.V., Melnik V.A.— Electron. text data.— M.: Russian New University, 2009.— 232 p. 3. Information security systems in leading foreign countries V.I. Averchenkov [et al.].-Bryansk: Bryansk State Technical University, 2012.- 224 p. 4. Olifer V.G. Olifer N.A. Computer networks. Principles of technology protocols (4th ed.) // St. Petersburg: - Peter, 2010, 916 p.
Date of last amendment	20.01.2023

Module Name:	**Module 24: Artificial Intelligence Systems (Elective Modul 6, EM6)**
Code	M27IS(Ba)
Module Elements	*Elective Subjects* Information Technologies in Accounting Three-Dimensional Simulation and Flash Technologies Simulation of Information Processes and Systems Protocols and Interfaces of Information Systems Technical Design Tools and Interactive Graphics Systems Knowledge Representation Model in Information Systems Mobile technologies and applications Artificial Intelligence Systems IntelligentInformation Systems Work Experience Internship 2
Semester Number:	6
Person responsible for the module	V.P. Kulikov
Lecturer:	Information Technologies in Accounting – V.P. Kulikov Three-Dimensional Simulation and Flash Technologies – N.V. Astapenko Simulation of Information Processes and Systems – T.V. Pyatkova Protocols and Interfaces of Information Systems – V.P. Kulikov Technical Design Tools and Interactive Graphics Systems – T.V. Pyatkova Knowledge Representation Model in Information Systems – V/P/ Kulikova Mobile technologies and applications– V.P. Kulikov Artificial Intelligence Systems – V.P. Kulikova Intelligent Information Systems– V.P. Kulikov Work Experience Internship 2 – Y.V. Kukharenko
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	6 semester: hours per week – 32 (lectures -3; labs-9; independent work of students -20); hours per semester – 600.
Workload:	Teaching Load: 180 hours Extracurricular Classes: 300 hours Total: 600 hours
Credit Points:	20 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of the previous undergraduate subjects: Automation of Financial Activities, Multimedia Technology and Animation Graphics, Profound Language Learning. System Analysis and System Analysis and Simulation, Profound Language Learning.
Expected Learning Outcomes:	Know theoretical basics of building the system interfaces, models and structures of information networks.Know the basic principles of managing mobile information systems; basic approaches, methods and models of mobile systems, relevant protocols and interfaces of mobile information systems; approaches to the presentation of user interfaces (UX / UI);

	technologies for working with dynamic content of mobile spectrum software products. Know the classification of AIS, models of knowledge representation, output solutions and communication models in AIS; structure and application of neural networks; theoretical and practical aspects of obtaining, formalization and structuring of problem knowledge; basic concepts of fuzzy sets; architecture, principles of construction and operation of expert systems; classification of IIS, models of knowledge representation, output solutions and models of communication in IIS ; the structure and application of neural networks; theoretical and practical aspects of obtaining, formalization and structuring of problem knowledge; basic concepts of fuzzy sets; architecture, principles of construction and functioning of expert systems. Be able to work with the solutions of the main software manufacturers for the design and development of protocols and interfaces, develop and maintain information and communication systems and networks. Be able to use a systematic approach in the study, design and development of mobile IS interfaces; apply the studied approaches, methods and models of mobile interfaces in practice; economically (statistically) and ergonomically substantiate solutions in the field of interfaces of mobile information systems; navigate the software and hardware and apply it in solving professional tasks of the mobile spectrum. Be able to use elements of fuzzy sets for mathematical formalization of initial information about the studied real situation or decision-making process. Have the skills to configure the program to automate the unique needs for accounting, specific to a particular enterprise; application of IT and mathematical models used in the analysis of systems of different nature, in the planning and forecasting in various areas of human economic activity. Have the skills to use existing standards and certification systems in practice; determine and measure the cost of quality with the achieved level of quality; solving problems related to the use and prospects of mobile information technologies for input, storage, processing, transmission and publication of digital information, incl. for products on a personal computer/mobile device and wide area/wireless computer networks. Possess the skills to possess the skills of the basic techniques of building fuzzy ES; formalization and structuring of problem knowledge. Demonstrate the ability to use the process of structuring the object of animation and algorithmization of tasks of animation systems; creating models of animation systems of different categories of objects and how to edit and modify them. Demonstrate the ability to work with mobile information processing software; storage and demonstration of dynamic content of mobile spectrum software products. Demonstrate the ability to understand the wide range of problems associated with the use and prospects of using AIS.
Intendend use/applicability	Modules: Information Systems Software
Content:	*1.Information Technologies in Accounting.* Within this subject, students are expected to master the basics of accounting, initially focusing on its computer form, to master the work in the accounting program 1C: Enterprise, to show ways to improve computer accounting, constantly based on the

results achieved, to get a fairly complete picture of the real technology of accounting using modern computer technology and accounting software.

2.Three-Dimensional Simulation and Flash Technologies
Fundamentals of computer modeling. Fundamentals of three-dimensional graphics and animation. Conceptual basis of object modeling. Methods of imaging a scene. Conceptual foundations of animation. Basic animation methods.

3. *Simulation of Information Processes and Systems*
Simulation random patterns. Simulation of random events. Simulation of random vectors. Simulation of random processes and threads. Identification of random patterns. Queueing system. Organization of simulation modeling. Simulation of systems with unreliable elements. Aggregate modeling. Simulation modeling of economic organizational systems.

4.Protocols and Interfaces of Information Systems
Formation of students' whole picture of the basics of analysis, selection and operation, as well as the development of protocols and interfaces of information systems. The susbject is devoted to teaching students the introduction of protocols and interfaces of information systems, types of user interfaces and stages of development, models, quality criteria of the user interface, the processes of designing the graphical interface, the development of dialogues and the main components of graphical user interfaces, typical solutions for the implementation of digital interfaces, service-oriented and serial interfaces, SOAP protocols, application programming interfaces, protocols of remote access systems.

5. *Technical Design Tools and Interactive Graphics Systems*
The subject is devoted to teaching students the concepts, technologies, multimedia, classes of multimedia systems and types of multimedia products, multimedia software, script, its category, interactive development; animation, types and means of creating animation, dynamic simulation of 3D objects, functions and capabilities of 3D programs; the basics of digital audio, audio file formats, audio editors; video recording, basics of digital video, software for working with video.

6. *Knowledge Representation Model in Information Systems*
The subject is devoted to teaching students the basic concepts of knowledge engineering, general information on knowledge, classification of knowledge, characteristics of knowledge and distinction of knowledge from data, models of knowledge representation and their types, basic concepts of logic statements and predicate logic, axiomatic approach to the organization of logical inference, logical programming, Frame, network, production models of knowledge representation, presentation of inaccurate and fuzzy knowledge, fuzzy sets and their connection with the intelligent systems theory, processing methods, technologies of knowledge acquisition, tools for working with knowledge.

Mobile technologies and applications
Classification of mobile devices. Architecture of mobile devices and their components. Java for mobile devices. Programming for OS Android. Features of the iOS ecosystem. Features of developing applications for Windows Phone.

Artificial Intelligence Systems. Mastering the principles of organization and functioning of AIS, as well as practical skills

	of their design, mastering systematic ideas about the possibilities and areas of use of AIS, their architectural features and means of their creation. Particular attention is paid to the study of methods of obtaining, formalization and structuring of problem knowledge and to storage and use of knowledge in knowledge bases. *Intelligent Information Systems.* Basics of intellectualization of information systems for various purposes. Problem areas of artificial intelligence. Models of data and knowledge representation, classification of intelligent systems. Methods of eliminating uncertainty in the presentation of knowledge, their generalization and classification. Problems of computer logic and linguistics. Intellectualization of applied procedures in the subject area - search, management and control. Methodological aspects of expert systems construction. Dialogue systems. *Work Experience Internship 2.* Design of intelligent systems for automation of business processes of enterprises.
Examination Form, module mark:	Comprehensive module examination including: *Information Technologies in Accounting / Three-Dimensional Simulation and Flash Technologies / Simulation of Information Processes and Systems* – курсоваяработа *Protocols and Interfaces of Information Systems / Technical Design Tools and Interactive Graphics Systems / Knowledge Representation Model in Information Systems/ Mobile technologies and applications* – computer-based testing *Artificial Intelligence Systems /Intelligent Information Systems* – computer-based testing *Work Experience Internship 2* – intership report defence
Technical/Multimedia Facilities:	Multimedia System. IT room.
Study Materials:	Y. Alexandrova. 1C: Accounting 8.1 from Scratch! Book+Video Course (+CD), Publishing Houser: Luchshiye Knigi, 2015 S. A. Aristov. Simulation Simulation of Economic Processes, Yekaterinburg, 2013 J. Moore, L. Wetherford et al. Economic Simulation in Excel, M-SPb, 2014 K. E. Erglis. Interfaces of Open Systems. Training course. – M.: Goryachaya Liniya-Telecom, 2009. – 256 p. A. A. Lapin. Interfaces: Selection and Implementation. – M.: Tekhnosfera, 2017. 168 p. D. A. Khvorostov. 3D Studio Max + VRay. Environment Design: Textbook / D. A. Khvorostov. - M.: Forum: SRC INFRA-M, 2015. - 272 p. V. I. Korneyev. Interactive Graphic Systems. 3rd edition (electronic) M.: BINOM. Laboratoriya znaniy, 2015 V. A. Morozova, V. I. Pautov. Knowledge Representation in Expert Systems: Textbook / V. A. Morozova, V. I. Pautov - Yekaterinburg: Publishing House of Ural State University, 2017. 120 p. N. M. Abdikeyev. Corporation Knowledge Management and Business Reengineering: Textbook / N. M. Abdikeyev, A. D. Kiselyov.-M.: INFRA-M, 2013 - 382 p. Griffiths Don, Griffiths David G85 Head First. Programming for Android. - St. Petersburg: Peter, 2016. - 704 p.

	Android NDK Beginner's Guide Second Edition 2015 Discover the native side of Android and inject the power of C/C++ in your applications Sylvain Ratabouil $4.99
	HUMAN MACHINE INTERFACE DESIGN Lecture notes Compiled by A. A. Abrosimov, V.V. Zaivy, Samara 2016 95 p.
	Krishna Golden A good interface is an invisible interface. St. Petersburg, Peter, 2016, 256s
	Kirill Egerev "This button needs text: Short and clear about UX writing": Alpina Publisher; Moscow; 2021 - 70s
	Laws of UX by Jon Yablonski Copyright © 2020 Jon Yablonski. All rights reserved.
	Johnson J. Smart Design: Simple Techniques for Designing User Interfaces. St. Petersburg: Peter, 2021. - 224 p.: ill.
	Bill Phillips, Chris Stuart, Christine Marsicano, Brian Android Gardner. Programming for professionals. 4th edition. - St. Petersburg: Peter, 2021. - 704 p.: ill.
	Learn Apple HomeKit on iOS A Home Automation Guide for Developers, Designers, and Homeowners[Text Wrap Break]Jesse Feiler, APress* 2016, 137p.
	Apple Device Management: A Unified Theory of Managing Macs, iPads, iPhones, and AppleTVs Charles Edge, Rich Trouton APress* 2020, 768p.
	I. A. Bessmertniy. Artificial Intelligence Systems: Textbook for academic bachelors / I. A. Bessmertniy. – 2nd ed., updated and revised. – M.: Yurayt, 2017. - 130 p.
	Y. Borovskaya. Basics of Artificial Intelligence / Y. Borovskaya. – M.: Binom, 2015. – 128 p.
	M. V. Burakov. Artificial Intelligence Systems. Textbook / M. V. Burakov. – M.: Prospect, 2017. – 440 p.
	V. B. Kudryavtsev Intelligent Systems: Textbook and Practical Course for undergraduate and graduate / V. B. Kudryavtsev, E. E. Gasanov, A. S. Podkolzin. – 2nd ed., updated and revised; Lomonosov MSU – Moscow: Yurayt, 2017. – 219 p.
	L. N. Yasnitskiy. Introduction to Artificial Intelligence: Textbook / L. N. Yasnitskiy. – Moscow: Akademiya, 2010. – 176 p.
Date of last amendment	20.01.2022

Module Name:	**Module 25: Information Systems Software (Elective Modul 7, EM7)**
Code	M29IS(Ba)
Module Elements	*Elective Subjects* IT Project Management Information System Management IT Technologies in Scientific Research Organizing of Scientific Research WEB Applications Designing Internet Applications Designing Information Systems Software Economic Information Systems
Semester Number:	7
Person responsible for the module	Y.V. Kukharenko
Lecturer:	IT Project Management – Y.V. Kukharenko Information System Management – V.P. Kulikov IT Technologies in Scientific Research – Y.V. Kukharenko Organizing of Scientific Research – V.P. Kulikova WEB Applications Designing – O.A. Nikishina Internet Applications Designing – N.V. Astapenko Information Systems Software – N.V. Astapenko Economic Information Systems – V.P. Kulikova
Language:	Russian, Kazakh
Curriculum relation:	Information Systems (Ba)
Type of teaching / number of hours per week and per semester :	7 semester: hours per week – 60 (lectures -4; workshops -2; labs-16; independent work of students -38); hours per semester – 900.
Workload:	Teaching Load: 330 hours Extracurricular Classes: 570 hours Total: 900 hours
Credit Points:	30 ECTS
Conditions for Examinations:	For admission to the exam, the student must score at least 50 points out of 100 available for the subject
Recommended Conditions:	This module is based on the knowledge gained by students in the course of previous undergraduate subjects: Profound Language Learning, Software and Network Engineering. Information Protection, WEB- Programming, Graphic Means of Information Systems, Profound Language Learning, Software and Network Engineering, Business Administration in Information Systems
Expected Learning Outcomes:	Know: basic concepts related to the basic principles, functions and methods of information project management; existing standards and approaches in the field of high-tech project management; methods for determining and managing the risk range of IT projects. Know the basic definitions and concepts of web-design and programming, the basic techniques of creating and promoting sites; application design; principles of Internet application development; principles of database design; methods of connecting Internet pages to the developed database.Know classification, structure, configuration of information systems; general characteristics of the design process; main stages, methodology, technology and means of designing information systems, models, methods, standards and integration tools in the construction and maintenance of corporate information systems; theoretical basics of modern information networks.

	Be able to: use the methods to assess the effectiveness of IT; manage IT-supply and IT-outsourcing. Be able to design, develop and promote web-resources and applications; possess the skills: design, development and marketing of web-applications; design various Internet applications; determine the specifics and methods of implementation of Internet applications. Be able to use architectural and detailed solutions in the design of systems, to implement the main stages of building networks, models, and hierarchy of models of processes in networks, information exchange management technology in networks; to assemble an information system from ready-made components, to adapt applications to changing operating conditions.
	Possess the skills: developing an IT strategy and working in a "team" when creating an IT project. Possess the skills to work with innovative products and technologies for the development and management of Web-content; database design in My SQL, configure the interaction of PHP pages with the database; demonstrate the ability to: design and create modern Internet applications. Possess the skills to use modern computer technology to search for information to solve the problem of critical analysis of this information and the justification of the ideas and approaches to the solution.
	Demonstrate the ability to: budgeting and application of tools for determination of economic efficiency of IT-projects for different types of organizations; working with the methods of personnel management of IT-project. Demonstrate the ability to put these skills into practice. Demonstrate the ability to choose and evaluate the method of implementation of information systems and devices (software, hardware or software and hardware) to solve the problem, to conduct a pre-design survey of the design object, system analysis of the subject area, their relationships, the ability to carry out the design works
Intendend use/applicability	Modules: Final Internship
Content:	*1.IT Project Management* Basics of various information systems management. Problem areas of control theory. Models of data and knowledge representation, classification of information systems. *2.Information System Management* Methods of eliminating uncertainty in the presentation of knowledge, their generalization and classification. Problems of computer logic and linguistics. Intellectualization of applied procedures in the subject area - search, management and control. Methodological aspects of expert systems construction. Dialogue systems. *3.IT Technologies in Scientific Research* Place and role of science and IT technology in modern society. Basics of the science methodology. Concept of innovation and innovation. Structure and content of the stages of the research process. Principles of organization and planning of scientific researches with the help of IT technologies. *4.Organizing of Scientific Research* Systematic approach to the study of scientific activity. Essence, tasks, directions of research activity. Acquisition of competencies in the basics of research, preparation of reports

	and publications. Application of static analysis methods in the development of scientific research. . 5 *WEB Applications Designing.* Theoretical and practical comprehensive consideration of modern client web-development technologies used to create Web-sites. 6. *Internet Applications Designing.* Study of the design of Internet applications, the choice of structure and set of software components that implement the requirements for the information system, the study of modern information systems of various types.
Examination Form, module mark:	Comprehensive module examination including: *IT Project Management /Information System Management* – course paper *IT Technologies in Scientific Research /Organizing of Scientific Research* – computer-based testing *WEB Applications Designing /Internet Applications Designing* - course paper *Information Systems Software / Economic Information Systems* – computer-based testing
Technical/Multimedia Facilities:	Multimedia System. IT room.
Study Materials:	P. Jalote. Project Management in Information Technologies. – M.: Lori, 2014. – 224 p. A. T. Zub. Project Management. Textbook and Practical Course for academic bachelors. – Lyubertsy: Yurayt, 2016. – 422 p. S. P. Kovalenko. Project Management: a practical guide. – Mn: Tetralit, 2013. – 192 p. E. A. Sosnin. Management of Innovative Projects: Textbook. – Rostov-on-Don.: Phoenix, 2013. – 202 p. V. D. Shapiro. Project Management: a textbook for students. – M.: Omega-L, 2014. – 960 p. T. V. Gvozdeva. Design of Information Systems: Textbook / T. V. Gvozdeva, B. A. Ballod. – Rostov-on-Don: Phoenix, 2012. -508 pS. A. M. Vendrov. Design of Software for Economical Information Systems. M., Finance and Statistics, 2012. -347 p. G. N. Smirnova, A. A. Sorokin, Y. F. Telnov. Design of Economical Information Systems. Textbook. Moscow, Finance and Statistics, 2008.–510 p. S. Purewal. Basics of Web Application Development. St. Petersburg: Piter, 2015. – 272 p. B. Hogan, K. Warren, M. Weber, K. Johnson, and A. Godin. Web Programmer Book. St. Petersburg: Piter, 2013. – 345 p. Richard Nixon. Create Dynamic Websites Using PHP, MySQL and JavaScript – SPb.: Piter, 2011 . – 496 p. A. M. Vendrov. Design of Software for Economical Information Systems. M., Finance and Statistics, 2005. -544 p. A. M. Vendrov. Modern Technologies of Software Development // JetInfo Online, 2004. No. 4. T. M. Zubkova. Software Development Technology Orenburg: GOU ОГУ, 2004. 101 p. M. R. Kogalovskiy. Advanced Information System Technologies. — .: DMK Press, IT Company, 2003. — 288 p.
Date of last amendment	20.01.2023