

SARSEN AMANZHOLOV EAST KAZAKHSTAN STATE UNIVERSITY

AGREED
MSI Training and production
combine" of the akimat of the city
Ust-Kamenogorsk
B. Iskakov
2020.

APPROVED
Chairman of the faculty Council
Madiyarov M.N.
Protocol № 10
« 11 » 06 2020.

SYLLABUS

«Information and communication technologies»
name of discipline

FOR ALL EDUCATIONAL PROGRAMS OF THE UNIVERSITY

Form of training / full-time education
Full-time

Course 2

Semester 3

Number of credits 5

Lectures 20

Practical (seminar) classes

Laboratory research 30

Independent work of students with a teacher 75

Independent work of students 25

Exam 3 semester

Ust-Kamenogorsk, 2020

Compiler:  Kubentayeva Saniya,
docent; candidate of pedagogical sciences

Syllabus

The program of the discipline developed on the basis of standard curricula of general education disciplines for institutions of higher and (or) postgraduate education (Order of MES RK from 31.10.2018, No. 603) (for general education discipline)

Protocol №4 «21» 04 2020

Recommended at the meeting of the Department
Considered at the meeting of the Department and approved
Protocol №10 «03» 06 2020

Head of department  Zhantasova Zh.Z.

1. Information about the subject

Name of discipline <i>Information and communication technologies</i>	Discipline code	Number of credits 5	Course / Semester 1/ 1;2
The name of EP For all educational programs of the university	Code EP	Department of computer modeling and information technologies	Faculty of Natural Science and Technology
Time and place of the discipline <i>on schedule</i>			
Consultation time - according to the schedule			
Rating schedule: 7 and 15 weeks			
Name of the teacher, academic degree, academic title, position <i>Kubentayeva Saniya, docent; candidate of pedagogical sciences</i>		Contact information (phone, e-mail) 8 777 23 268 23 <i>Saniya_kub@mail.ru</i>	

2. Brief description of the discipline:

Purpose “Information and communication technologies” (for all specialties and undergraduate training): training students in professional and personal competencies, which allows the use of modern information technologies in various fields of professional activity, for scientific practical work, for self-educational and other purposes. Learning for educational and educational purposes, expanding the capabilities of students, increasing their general culture and education.

Tasks: Objectives of discipline include: teaching students the basics of algorithmic problems, the construction of efficient algorithms and the use of software packages, the study of the possibilities of modern information technologies and their development prospects, the study and the status and prospects of the hardware and software of computers and computer networks.

Competences

- owns a culture of thinking, is capable to synthesize, analyze, perception of the information, goal setting and selection of ways to achieve it;
- is capable logically true and clear to arguments to build oral and written language;
- is aware of the social importance of their future profession, has a high motivation to perform professional activities;
- He has experience on different types of computer systems, the ability to apply algorithmic languages;
- be able to use modern computer technology, telecommunications;
- know the prospects and trends of development of information technologies;
- able to acquire new knowledge, using modern information educational technologies;
- owns methodology of critical thinking;

Learning outcome

As a result of studying this discipline, the student knows: the basic concepts of automated information processing; basic methods and means of processing, storage, transmission and accumulation of information; basics of task algorithms; purpose and principles of using system and application software; basic components and principles of information and telecommunication networks; main threats and methods of ensuring information security; legal aspects of the use of information technology and software.

As a result of studying this discipline, the student can: use information resources to search and store information; use automated office management systems; apply specialized software to solve problems in the relevant field; apply methods and means of information protection; apply various forms of e-learning to solve professional knowledge.

Prerequisites

№	Name of discipline, sections (topics)
1	Informatics
2	Higher mathematics

Postrequisites

№	Name of discipline, sections (topics)
1	Network technology
2	Work on the Internet
3	Computer language

5. Calendar-thematic plan

№	Name of the discipline	Weeks	The number of class hours for occupations		The number of class hours for occupations		All (c)
			lecture (c.)	lecture (c.)	IWST (c)	IWS (c)	
1	An ICT role in key sectors of development of society. Standards in the field of ICT	1	1	2	1	5	9
2	Introduction to computer systems. Architecture of computer systems	2	1	2	1	5	9
3	Software. Operating systems	3	1	2	1	5	9
4	Human-computer interaction	4	1	2	1	5	9
5	Database systems	5	1	2	1	5	9
6	Data analysis. Data management	6	1	2	2	5	10
7	Networks and telecommunications	7	1	2	2	5	10
8	Cybersecurity	8	1	2	2	5	10
9	Internet technologies	9	1	2	2	5	10
10	Cloud and mobile technologies	10	1	2	2	5	10
11	Multimedia technologies	11	2	2	2	5	11
12	Smart technology	12	2	2	2	5	11
13	E-technologies. Electronic business. Electronic training. Electronic government	13	2	2	2	5	11
14	Information technologies in the professional sphere. Industrial ICT	14	2	2	2	5	11
15	Prospects of development of ICT	15	2	2	2	5	11
	All		20	30	25	75	150

6. Contents of lectures

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Topic 1. An ICT role in key sectors of development of society. Standards in the field of ICT

Lecture abstracts: Definition of ICT. Subject ICT and its purposes. An ICT role in key sectors of development of society. Standards in the field of ICT. Communication between ICT and achievement of the objectives of a sustainable development in the Millennium Declaration.

Literature: 2;5;7;8

Topic 2. Introduction to computer systems. Architecture of computer systems

Lecture abstracts (no more than 8 sentences)

Review of computer systems. Evolution of computer systems. Architecture and components of computer systems. Use of computer systems. Data representation in computer systems.

Literature: 2;6;7;8

Topic 3. Software. Operating systems

Software. Types of the software, purpose and characteristic. Basic concepts of OS. Evolution of operating systems. Classification of operating systems, including for mobile devices. Classification of desktop applications.

Literature: 2;6;7;8

Topic 4. Human-computer interaction

User interface as means of human-computer interaction. Usability of interfaces. Types of interfaces: command line interface, text interface, graphic interface. Physical and mental characteristics of the user. Development stages of the user interface. Types of testing of interfaces (testing of users). Perspectives of development of interfaces.

Literature: 2;5;7;8

Topic 5. Database systems

Bases of database systems: concept, characteristic, architecture. Data models. Normalization. Integrity constraint on data. Query tuning and their processing. Fundamentals of SQL. Parallel processing of data and their restoration. Design and development of databases. Technology of programming of ORM. The distributed, parallel and heterogeneous databases.

Literature: 2;5;7;8

Topic 6. Data analysis. Data management

Data analysis bases. Methods of collection, classification and prediction. Decision trees. Processing of large volumes of data. Methods and stages of Data mining. Tasks Data mining. Visualization of data.

Literature: 2;6;7;8

Topic 7. Networks and telecommunications

End devices, data transfer devices, transmission medium. Types of networks. Stack protocols: TCP/IP, OSI. IP addressing. Local and wide area networks. Wire and

wireless network technologies. DHCP protocol. Technologies of connection to the Internet. Telecommunication technologies.

Literature: 1;2;4

Topic 8. Cybersecurity

Security risks of information and their classification. Industry of cybersecurity. Cybersecurity and control of the Internet. Malicious applications. Measures and means of information protection. Standards and specifications in information security field. The acts of the Republic of Kazakhstan governing legal relations in the sphere of information security. Digital signature. Encoding.

Literature: 2;5;6;10

Topic 9. Internet technologies

Basic concepts Internet. The universal identifier of resources (URI), its assignment and components. Service DNS. Web technologies: HTTP, DHTML, CSS, and JavaScript. E-mail. Message format. SMTP, POP3, IMAP protocols.

Literature: 1;2;5;9

Topic 10. Cloud and mobile technologies

Data centers. Tendencies of development of the modern infrastructure decisions. Principles of cloud computing. Technologies of virtualization. Web service in the Cloud. Main terms and concepts of mobile technologies. Mobile services. Standards of mobile technologies.

Literature: 2;5;9;10

Topic 11. Multimedia technologies

Representation text, audio, video and graphical information in a digital format. Basic technologies for compression of information. 3-D representations of the virtual world and animation. Instruments of development of multimedia applications. Use of multimedia technologies for planning, descriptions of business processes and their visualization.

Literature: 2;6;9

Topic 12. Smart technology

Internet of things. Big data. Technology Block Chain. Artificial intelligence. Use of Smart-services. Green technologies in ICT. Teleconferences. Telemedicine.

Literature: 2;4;6;7

Topic 13. E-technologies. Electronic business. Electronic training. Electronic government

Electronic business: Main models of electronic business. Information infrastructure of electronic business. Legal regulation in electronic business. Electronic training: architecture, structure and platforms. Electronic textbooks. Electronic

government: concept, architecture, services. Formats of implementation of the electronic government in developed countries.

Literature: 3;5;6;8

Topic 14. Information technologies in the professional sphere. Industrial ICT

The software for the solution of tasks of the specialized professional sphere. Modern IT trends in the professional sphere: medicine, power, etc. Use of search engines and electronic resources in the professional purposes. Safety issues in industrial information and communication technologies

Literature: 2;6;8

Topic 15. Prospects of development of ICT

Prospects of development in the sphere of the IT market: development of the free software. Forming of an ecosystem of IT of entrepreneurship and support small startup of the companies. Programs of acceleration and incubation. Development of necessary infrastructure of electronic payments and logistics. Prospects of development of E-technologies.

Literature: 2;4;5;7

7. The contents of the practical (seminar) classes

practical exercises are not provided for according to plan

8. Contents of laboratory classes

Topic 1. Computation of metrics of productivity of computer system: speed, efficiency, energy expenses, Amdal's law, CPU time.

Guidelines for laboratory work (briefly): Calculate the performance of computer devices using both the tools built into OCWindows 7 and the installed CPU-Z program. Learn how to increase PC performance. To study the basic performance metrics of a computer system: speed, efficiency, energy consumption, Amdahl's law, CPU time, and test the performance of RAM, build a structural diagram of a PC.

Literature:2;5;7;8

Topic 2. Determination of properties of an operating system. Operation with files and directories.

Guidelines for laboratory work (briefly): practical study of the command line capabilities of the MicrosoftWindows operating system using frequently used commands as an example; practical acquaintance with the menu interface of the OS using the FarManager file manager as an example; practical study of the Windows GUI capabilities.

Literature:2;5;6;7

Topic 3. Determination of requirements to development "convenient in application" the website.

Guidelines for laboratory work (briefly): A website should consist of no more than six pages and present the following information: company name, general brief information about the company, list of products / services, brief reviews of your activities, list of the largest customers with links to their Web sites. A website project must meet the following requirements: clarity of language, structured materials, unity of style, have their own face. The report on the completed task contains graphic material reflecting the structure of the site, as well as text comments.

Literature 2;5;7;8

Topic 4. Development of database structure, creation of tables and requests. Working with a MySQL relational database. MySQL database administration using phpMyAdmin. Working with a single-table database.

Guidelines for laboratory work (briefly): To study the technology of work in the environment of a database management system; acquire practical skills in developing a data schema and creating a relational database structure; learn to form queries for data search and selection.

Literature 2;5;6;7

Topic 5. Design and creation of the presentations of lecture material, scientific reports, etc.

Guidelines for laboratory work (briefly): Learn the principles of creating a slide show using Microsoft PowerPoint, the use of animation and sound; gaining presentation skills based on a slide show.

Literature 1;4;7;8

Topic 6. Processing of numerical information, editing formulas and creation of charts in spreadsheet editors.

Guidelines for laboratory work (briefly): The development of professional skills in the environment of the table processor MS Excel.

Literature 2;5;7;8

Topic 7. Creation of a simple network configuration. IP addressing. Monitoring of a network. Analysis of traffic. Use of sniffers for the analysis of network packets

Guidelines for laboratory work (briefly): Know the principles of network traffic analysis. Explore the principles of using electronic digital signature (EDS) using the PGP program as an example in the process of e-mail messaging.

Literature 1;2;4;9

Topic 8. Use of hardware and software for key generation. Application of the EDS and encoding in case of message exchange by E-mail. Settings of the Firewall program element of the computer network for network traffic monitoring and filtering. Working with the various antivirus programs.

Guidelines for laboratory work (briefly): to study the principles of using electronic digital signature (EDS) by the example of working with the PGP program in the process of exchanging messages by e-mail.

Work is performed in a group: two students and a teacher. The sequence of work is described in the "Task" section.

Literature 2;4;7;10

Topic 9. Data acquisition from the server. Working with WordPress and Joomla web content management systems. Development a website design using Photoshop multifunctional graphic editor and CSS style sheet language. Using of the previously developed MySQL database for the work of the website

Guidelines for laboratory work (briefly): Learn how to use styling. Learn how to create and apply style sheets to control the presentation of web page content.

Literature 2;7;8;9

Topic 10. Introduction to Google Docs and Microsoft Office Web Apps cloud services. Creation accounts to work with cloud services. Study of operation modes associated with file storage, sharing and processing. Use of mobile technologies for receiving an information access. GPS navigators. GSM a signalling.

Guidelines for laboratory work (briefly): Internet services - services provided on the Internet to users, programs, systems, levels, functional blocks. On the Internet, services provide network services. An account means an “account” and is a set of data about a user that he enters and stores on a website or Internet service. In other words, an account is an Internet passport that a user fills out to register on the necessary site.

Some services cannot be accessed without registration. An account is created for the convenience of users, thanks to the presence of an account, you can access most of the services.

Literature 2;7;8;9

Topic 11. Creation of video files with use of programs: HyperCam, Adobe Premiere Pro, Windows Movie Maker, etc.

Guidelines for laboratory work (briefly): Learn how to edit AdobePremierePro video editing. Obtaining practical skills in creating clips, using and setting captions, video transitions and background music.

Literature 2;7;8;9

Topic 12. Operation with Smart-applications: Smart TV, Smart Hub, etc.

Guidelines for laboratory work (briefly): to study the features of Smart platforms and the functionality of digital TVs.

Literature 3;5;7;8

Topic 13. Operation with services on the website of the electronic government http://egov.kz/cms/ru/governmentservices/for_citizen: registration of requests, obtaining counterparts of documents, etc.

Guidelines for laboratory work (briefly): Learn the basics of work in the electronic government of Kazakhstan.

Literature 3;5;7;8

Topic 14. Development of structure and the maintenance of a lesson in the environment of remote learning: Moodle, eDX, etc.

Guidelines for laboratory work (briefly): To study the principles of constructing the structure and content of training courses in distance learning systems.

Literature 2;5;7;8

Topic 15. Installation and use of application programs in the professional sphere. Working in the Matlab environment for scientific and technical computing. Working with the Matlab toolboxes for applied problem solving.

Guidelines for laboratory work (briefly): to study the stages of application software installation, learn how to configure and work with application software.

Literature 3;4;8

9. Tasks IWST and IWS

№ Topic	The name and contents of the tasks for the IWST and IWS	The content of tasks for the IWST and IWS	Form of control	Term of delivery
1	Development of flowcharts of operation of devices of the computer. Stage 1.	Prepare a short summary on the topic of the lecture. Information message Compose a "Compressed Information Sheet" (SLI) on the topic of the lecture, protect.	oral job protection protection sli	1
2	Development of flowcharts of operation of devices of the computer. Stage 2.	watching the video "Computer Architecture" Preparation for testing on the topic	testing	2
3	Collecting, the analysis and structurization of data in the professional environment (development of the database). Stage 1.	Preparation for verification work on number systems and independent work. Multipresentation "Classification of operating systems"	control work.	3
4	Collecting, the analysis and structurization of data in the professional	watching the video "human-computer interaction" compilation of a poster on	poster protection	4

	environment (development of the database). Stage 2.	the topic		
5	Description of network topology of the office building. Stage 1	Multipresentation «Database management» Preparation for testing on the topic	testing	5
6	Description of network topology of the office building. Stage 2	Compose a “Compressed Information Sheet” (SLI) on the topic of the lecture, protect.	protection sli	6
7	Comparative analysis of anti-virus means of information protection. Stage 1.	watching the video «Protocol TCP_IP.mp4» creating a presentation on the topic	presentation protection	7
8	Comparative analysis of anti-virus means of information protection. Stage 2.	watching the video «Information Security» Write an essay on the topic	protection of essay	8
9	Information search in a specialty profile on the Internet, use of cloud services for storage and data processing. Stage 1.	watching the video «Internet technologies» Information Sheet” (SLI) on the topic of the lecture, protect.	protection protection sli	9
10	Information search in a specialty profile on the Internet, use of cloud services for storage and data processing. Stage2.	watching the video « What is cloud storage?» Create a cloud storage comparison table for Android	oral job protection	10
11	Creation of an emblem, the video and other materials on a specialty profile means of multimedia technologies. Stage 1.	watching the video «Multimedia technology: advantages, disadvantages» Preparation for testing on the topic	testing	11
12	Creation of an emblem, the video and other materials on a specialty profile means of multimedia technologies. Stage 2	watching the video «Smart technologies» Information Sheet” (SLI) on the topic of the lecture, protect.	protection sli	12
13	Presentation and protection of the main results of design activity in the specialty.	watching the video «E-Learning Animation» creating a presentation on the topic	presentation protection	13

	Stage 1.			
14	Presentation and protection of the main results of design activity in the specialty. Stage 2.	watching the video "Information technologies in the professional sphere" Prepare a short summary on the topic of the lecture.	background check	14
15	Defense of the independent study of students.	prepare a project on the topic group work	poster protection	15

Consultation in all questions according to the schedule.

9. Evaluation Policy

One of the elements of the educational process in terms of credit technology training is the use of point-rating evaluation system of students educational achievements. The grading policy is based on the principles of objectivity, transparency, flexibility and high differentiation.

The study of the discipline ends with an examination in various forms (written or oral examination, testing), which covers all the material passed. A prerequisite for admission to the exam is to perform all the tasks provided in the program.

Each task is estimated 0-100 points.

№	Kind of work	Score (max score) for one task	Number of tasks	Total
Rating 1				
1	input verification work	100	1	100
2	oral job protection	100	1	100
3	control work	100	1	100
4	presentation protection	100	1	100
5	testing	10	10	100
6	protection sli	100	1	100
7	presentation protection	100	1	100
Total				100
Rating 2				
1	protection of essay	100	1	100
2	protection sli	100	1	100
3	oral job protection	100	1	100
4	testing	100	1	100
5	protection sli	100	1	100
6	presentation protection	100	1	100
7	background check	100	1	100
8	poster protection	100	1	100
Total				100

Admission rating score, which is calculated as the arithmetic mean of the sum of all current and milestone control scores obtained during the academic period:

$$AD = (CC1 + BC2 + CC3 + \dots + CCn + BC1 + BC2) / (n+2),$$

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where, AD-admission rating; CC-current control; BC-boundary control; n-the number of current controls; 2 – the number of boundary controls.

To the final control (FC) on discipline allowed students who have fulfilled all the requirements of the discipline program (performance and delivery of all practical (seminars, laboratories) and tasks on independent work of students with a teacher, independent work of students), scored a rating of admission (at least 50 points). Students who do not have a positive assessment of the rating of admission to the discipline (at least 50%) are not allowed to the exam.

The final grade for the discipline is calculated automatically by the formula:

$$\text{Result} = (\text{ME1} + \text{ME2}) / 2 * 0,6 + \text{examination score} * 0,4,$$

where, ME1- Midterm Examination; ME2- Midterm Examination.

The final assessment of the discipline is calculated only if the student has a positive assessment of both the rating of admission, and the final control. At absence on the final test for a good or valid reason in the "Examination mark" is set to "0" (zero). Results of intermediate certification on discipline are brought to students in the same day.

**Letter system of evaluation of educational achievements of students,
corresponding to the digital equivalent of a four-point
system**

Evaluation on alphabetic system	Digital equivalent of points	%- content	Assessment according to the traditional system
A	4,0	95-100	Excellent
A-	3,67	90-94	
B+	3,33	85-89	Good
B	3,0	80-84	
B-	2,67	75-79	
C+	2,33	70-74	
C	2,0	65-69	Satisfactory
C-	1,67	60-64	
D+	1,33	55-59	
D	1,0	50-54	
FX	0,5	25-49	Unsatisfactory
F	0	0-49	

10. Teacher requirements, policies and procedures *(select the language of instruction)*

The policy of students educational achievements evaluation is based on the principles of academic integrity, unity of requirements, objectivity and fairness, openness and transparency.

At the first training session, the teacher introduces students to the content of the working curriculum (syllabus) of the discipline, the planned learning outcomes of the discipline and the procedures for their evaluation.

In the case of academic dishonesty on the part of students of the University:

- during classroom and extracurricular activities: after the first violation, the established Commission conducts a conversation with the student; the act fixes the

warning issued and the measure taken (reduction of the assessment for the assessed work; cancellation of the written work of the student, the recommendation to re-conduct the control event, etc.). In case of repeated admission of the facts of academic dishonesty during the academic year, the Commission is again created an act is drawn up and submitted to the Disciplinary and anti-corruption Council (hereinafter-DAC) for further decisions;

- during the intermediate or final certification: the student who has shown academic dishonesty, is removed from the audience without the right to retake the exam in the same academic period. Thus in the examination sheet record "it is removed from examination for manifestation of academic dishonesty" with indication of its type is brought. Re-examination is carried out in the Summer semester or in the next academic semester on a fee basis. In this case, the student is re-enrolled in this discipline, attends all types of training sessions, performs all types of training according to the working curriculum and passes the exam. In case of repeated removal from the exam (during the entire period of study at the University), the student is expelled without the right to further recovery in EKSU.

Attendance by students of all classroom classes without delay is mandatory. In case of skipping classes are worked out in the manner prescribed by the Dean's office.

The presence at the lectures of unauthorized persons who are not a contingent of students of this course is prohibited.

Works should be handed over in the specified terms. The deadline for all assignments is 5 days before the start of the examination session.

Revision of the topic and working out of the materials for each training session is mandatory. The degree of mastering of educational materials is checked by tests or written works. Students may be tested without notice.

When performing independent work of the student under the guidance of the teacher to consider the following main functions:

- the first-involves the implementation of the active perception of students of the teacher's information received during the installation sessions on the subject;
- the second function assumes that students independently, based on the recommendations of teachers, study manuals, literary sources, doing homework, test and coursework, etc. At this stage, the students are required knowledge of working methods, fixing their difficulties, self-organization and self-discipline;
- the third function of students is to analyze and systematize their difficult situations, identify the causes of difficulties in understanding and assimilation of educational material, performing other educational activities. Students translate insoluble difficulties in the system of questions for the teacher (rank them, arrange, make out), build their own version of the answers to these questions;
- the fourth function of students is to appeal to the teacher for appropriate explanations, advice, consultation.

11. Exam questions

1. An ICT role in key sectors of development of society.
2. Communication between ICT and achievement of the objectives of a sustainable

development in the Millennium Declaration.

3. Review of computer systems. Evolution of computer systems.
4. Software. Types of the software, purpose and characteristic.
5. Basic concepts of OS.
6. Evolution of operating systems.
7. Classification of operating systems, including for mobile devices. Classification of desktop applications.
8. User interface as means of human-computer interaction.
9. Types of interfaces: command line interface, text interface, graphic interface.
10. Development stages of the user interface.
11. Types of testing of interfaces (testing of users).
12. Perspectives of development of interfaces.
13. Bases of database systems: concept, characteristic, architecture.
14. Data models. Normalization. Integrity constraint on data. Query tuning and their processing.
15. Fundamentals of SQL. Parallel processing of data and their restoration.
16. Data analysis bases. Methods of collection, classification and prediction. Decision trees.
17. Processing of large volumes of data. Methods and stages of Data mining. Tasks Data mining. Visualization of data.
18. End devices, data transfer devices, transmission medium.
19. Types of networks. Stack protocols: TCP/IP, OSI.
20. IP addressing. Local and wide area networks. Wire and wireless network technologies.
21. DHCP protocol. Technologies of connection to the Internet.
22. Telecommunication technologies.
23. Security risks of information and their classification.
24. Industry of cybersafety. Cybersafety and control of the Internet.
25. Malicious applications. Measures and means of information protection.
26. Standards and specifications in information security field. The acts of the Republic of Kazakhstan governing legal relations in the sphere of information security.
27. Digital signature. Encoding.
28. Basic concepts Internet. The universal identifier of resources (URI), its assignment and components.
29. Service DNS. Web technologies: HTTP, DHTML, CSS, and JavaScript.
30. E-mail. Message format. SMTP, POP3, IMAP protocols.
31. Technologies of virtualization. Web service in the Cloud.
32. Main terms and concepts of mobile technologies.
33. Mobile services. Standards of mobile technologies.
34. Basic technologies for compression of information. 3-D representations of the virtual world and animation.
35. Instruments of development of multimedia applications.
36. Use of multimedia technologies for planning, descriptions of business processes and their visualization.

37. Internet of things. Big data. Technology Block Chain.
38. Artificial intelligence. Use of Smart-services.
39. Green technologies in ICT. Teleconferences. Telemedicine.
40. Electronic business: Main models of electronic business.
41. Information infrastructure of electronic business. Legal regulation in electronic business.
42. Electronic training: architecture, structure and platforms.
43. Electronic textbooks. Electronic government: concept, architecture, services.
44. Formats of implementation of the electronic government in developed countries.
45. Modern IT trends in the professional sphere: medicine, power, etc.
46. Use of search engines and electronic resources in the professional purposes.
47. Safety issues in industrial information and communication technologies.
48. Forming of an ecosystem of IT of entrepreneurship and support small startup of the companies.
49. Programs of acceleration and incubation. Development of necessary infrastructure of electronic payments and logistics.
50. Prospects of development of E-technologies.

12. List of references *(on disciplines of social and humanitarian profile-published for the last five years; on natural, technical, agricultural disciplines - for the last ten years.)*

Main literature: (be sure to specify translated into the Kazakh language foreign textbooks (subject to availability):

1. Таненбаум Э.С., Уэзерол Д.Дж Компьютерлік желілер. 1-бөлім: Оқулық/ ауд. А.М. Махметова, С.Б. Беркімбаева. –Алматы, 2013
2. D.Shynybekov, R.Uskenbayeva..Information and communication technologies. Textbook: In 2 parts. –Part 1. Ist edition –Almaty: IITU, 2017
3. D.Shynybekov, R.Uskenbayeva..Information and communication technologies. Textbook: In 2 parts. –Part 2. Ist edition –Almaty: IITU, 2017
4. Клаус Шваб «Төртінші индустриялық революциясы». Төртінші индустриялық революция. Аудармашылар: Ақыш Н.Б., Бимендиева Л.Ә., Матыжанов К. І., 2017 жыл, 184б.
5. June J. Parsons and Dan Oja, *New Perspectives on Computer Concepts 16th Edition - Comprehensive*, Thomson Course Technology, a division of Thomson Learning, Inc Cambridge, MA, COPYRIGHT © 2014.

Additional:

1. Компьютерлік жүйелер архитектурасы және операциялық жүйелер: оқу құралы/ С.З. Сапакова. –Алматы: Қазақ университеті, 2016. 278 б.
2. Нурпеисова Т.Б., Кайдаш И.Н. ИКТ: Учебное пособие./ Алматы: «Бастау», 2017. -183 стр.
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