



MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION  
Federal State Autonomous Educational Institution of Higher Education  
**"Far Eastern Federal University"**  
(FEFU)  
INSTITUTE (SCHOOL) OF LIFE SCIENCES AND BIOMEDICINE (SCHOOL)

AGREED  
Head of OP

(signature)

December 21, 2021



Yu.S. Khotimchenko  
(FULL NAME)

APPROVE

Director of the Department of Pharmacy and Pharmacology

(signature) (I.O. Surname)

December 21, 2021

E.V. Khozhaenko

WORKING PROGRAM OF THE DISCIPLINE  
bioinformatics

Area of study 32.04.01 Public health

Master's program "Leadership and governance in public health (program in English for foreign citizens)"

Form of training: full-time

course 1 semester 2

lectures at 6 p.m.

practical classes 36 hours.

including using MAO lek. 0 hours/practice 10 o'clock

total classroom hours 54 hours.

including using MAO 10 hours

independent work 54 hours.

including preparation for the exam 0 hour.

control works (quantity) are not provided

term paper / term project are not provided

credit 2 semester

The work program was compiled in accordance with the requirements of the Federal State Educational Standard in the field of study 32.04.01 Public Health, approved by order of the Ministry of Education and Science of Russia dated 31.05.2017 No. 485.

The work program was discussed at a meeting of the Department of Pharmacy and Pharmacology protocol No. 4 of December 21, 2021.

Director of the Department Ph.D., E.V. Khozhaenko

Compiled by: Candidate of Medical Sciences, Associate Professor Rasskazova V.N.

Reverse side of the title page of the RPD

1. The work program was revised at a meeting of the Department / department / department (implementing the discipline) and approved at a meeting of the Department / department / department (issuing structural unit), protocol dated “ \_\_\_\_ ” \_\_\_\_\_ 2021 No. \_\_\_\_\_
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## I. Goals and objectives of mastering the discipline:

Target:

on the basis of studying the basic concepts of the discipline, prepare a specialist with the knowledge and skills to use computer applications, information support tools for medical decisions, automated medical and technological systems to solve problems in medicine and healthcare.

Tasks:

- Raise the level of professional skills in the field of healthcare informatization;
- explore additional possibilities of cybernetics and informatics;
- to study the technological levels of information processing in medicine;
- identify ways and means of applying the acquired knowledge in the practice of medical personnel;
- learn additional features of Microsoft applications;;
- to study modern problems of informatization.

Professional competencies of graduates and indicators of their achievement:

Task type	Code and name of professional competence (result of development)	Code and name of the indicator of achievement of competence
research	PC-1 Ability to calculate, evaluate and analyze indicators characterizing the activities of a medical organization, and indicators characterizing the state of public health	PC-1.1 Knows the principles of collecting and processing information PC-1.2 Can create a data matrix, code the material PC-1.3 Owns statistical methods of data processing, including using information and analytical systems and the information and telecommunication network "Internet"

Code and name of the indicator of achievement of competence	Name of the assessment indicator (the result of training in the discipline)
PC-1.1 Knows the principles of collecting and processing information	Knows the principles of collecting, processing, analyzing and providing information Able to collect, process, analyze and provide information in their professional activities Possesses the skill of collecting, processing, analyzing and providing information in their professional activities
PC-1.2 Can create a data matrix, code the material	Knows how to encode information Able to create a data matrix, conduct material coding Proficient in coding material
PC-1.3 Owns statistical methods of data processing, including using	Knows the basic methods of data processing, including using information and analytical systems and the

information and analytical systems and the information and telecommunication network "Internet"	information and telecommunications network "Internet" Ability to process and present data Owns statistical methods of data processing, including using information and analytical systems and information and telecommunications network "Internet"
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To form the above competencies within the framework of the Bioinformatics discipline, the following methods of active / interactive learning are used: lectures - conferences, problem lectures, visualization lectures; practical exercises - debate, round table (preparation and discussion of abstracts).

## II. The complexity of the discipline and types of training sessions in the discipline

The labor intensity of the discipline is 3 credit units (108 academic hours).  
(1 credit unit corresponds to 36 academic hours)

The types of training sessions and work of the student in the discipline are:

Designation	Types of training sessions and work of the student
Lek	Lectures
Lek electr.	
Etc	Practical lessons
Right electr.	
SR:	Independent work of the student during the period of theoretical training
including control	Independent work of the student and contact work of the student with the teacher during the period of intermediate certification
	And other types of work

Discipline structure:

Full-time form of education.

No.	Section name disciplines	Semester	The number of hours by type of training sessions and work of the student						Forms of intermediate certification
			Lek	Lab	Etc	OK	SR	Control	
	Module 1. Introduction to medical informatics. Basic concepts of medical informatics. Features and types of medical information	2	4		8				

	Module 2	2	8		12				
	Module 3. Processing and analysis of medical information	2	6		16				
	Total:	2	18	-	36	-	54		offset

### **III. STRUCTURE AND CONTENT OF THE THEORETICAL PART OF THE COURSE**

Lectures 18 hours.

Topic 1. Basic concepts of medical informatics (2 hours).

Topic 2. Using the main functions of the MS Excel software application for processing and analyzing medical information and plotting diagrams (2 hours).

Topic 3. The state of research on the problems of the information medical society. Medical science in the information society. Health care in the information society (2 hours).

Topic 4. Informatization of healthcare in the context of the information society. Informatization of health care and the formation of new cultural tools. Informatization of medical organizations in the context of healthcare informatization (2 hours).

Topic 5. Hardware and software informatization of healthcare. The concept of information and communication environment and its formation on the basis of electronic medical resources (2 hours).

Topic 6. Professional training and retraining of medical personnel in the context of healthcare informatization. Information activity of medical workers (2 hours).

Topic 7. Automation in healthcare. Electronic learning systems (ETS). Distance learning. Automated learning systems (ATS) (2 hours).

Topic 8. Automated control systems (ACS) of a medical organization. Theoretical principles and methods for improving the efficiency of automation of medical organizations. Information technologies in quality management in medical organizations (2 hours).

Topic 9. The current state of healthcare informatization in the Russian Federation (2 hours).

#### **IV. STRUCTURE AND CONTENT OF THE PRACTICAL PART OF THE COURSE AND INDEPENDENT WORK**

##### **Practical lessons**

(36 hours, including with the use of MAO - 10 hours).

*Module 1: Introduction to Health Informatics.* Basic concepts of medical informatics. Features and types of medical information (8 hours)

Lesson 1. Using the main functions of the MS Excel software application for processing and analyzing medical information (4 hours)

Lesson 2. Features and types of medical information (4 hours).

*Module 2: Using the power of MS Excel in medical data processing (12 hours)*

Lesson 3. Using the basic functions of the MS Excel software application for processing and analyzing medical information (4 hours)

Lesson 4. Formatting function in MS Excel (4 hours). Functions for entering and changing information data in MS Excel. Ways to change the format of information data in MS Excel. Types of information data addressing in MS Excel.

Lesson 5. Troubleshooting and working on errors in MS Excel (4 hours). Entering information data in MS Excel according to the conditions of the task. Construction of functions in MS Excel according to the conditions of the problem. Using various methods of constructing diagrams in MS Excel. Implementation of own information databases in MS Excel, taking into account production tasks.

*Module 3. Processing and analysis of medical information (16 hours)*

Lesson 6. Reliability of medical information (4 hours). Methods for determining reliability. Availability of medical information. Ways to get it.

Session 7. Measures of medical information (4 hours). Informatization of healthcare. Goals, objectives and functions of healthcare informatization.

Lesson 8. Information support according to the goals of healthcare informatization (4 hours).

Development of healthcare informatization. Problems of medical informatics.

Lesson 9. Information training of medical personnel (4 hours). The current state of informatization of health care in the Russian Federation.

#### **Schedule for the implementation of independent work on the discipline**

<b>No. p/p</b>	<b>Date/Due dates</b>	<b>Type of independent work</b>	<b>Approximate lead times</b>	<b>form of control</b>
1	1-3rd week	Preparation of abstracts	18 hours	Protection
2	4-6th week	Presentation preparation	18 hours	Protection

3	7-9 weeks	Preparation for the test	18 hours	offset
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Independent work of students consists of preparing for practical classes, working on recommended literature, writing reports on the topic of the seminar, preparing presentations, abstracts.

The teacher offers each student individual and differentiated tasks. Some of them can be carried out in a group (for example, preparing a report and presentations on the same topic can be done by several students with a division of their duties - one prepares a scientific and theoretical part, and the second analyzes practice).

### **List of types of independent work**

Preparation for a practical lesson, preparation of a report on a selected aspect of the topic of a practical lesson or selection of practical material for participation in the discussion constitute the content of the master's independent work. Lecture notes, professional literature, educational and methodological support of the discipline can become the material for preparation. Forms of current control: survey, group discussion, control tasks, report presentation.

One of the necessary components for the successful development of the course is writing an essay.

Search and study of the latest theoretical and applied sources on social management in Internet resources.

Assessment of knowledge and skills is carried out at an intermediate control point after passing the appropriate section of the discipline. For methodological support of mastering the discipline, the department develops teaching aids (recommendations and instructions for students and teachers, etc.), which detail the goals and methods of conducting classes.

Independent work of students includes the study of teaching aids, materials, work on the Internet, which makes it possible to form the appropriate skills and abilities, is the foundation for making rational management decisions in the economic field of healthcare. Active use of computer teaching and control technologies in the educational process contributes to the formation of students' skills to use modern innovative educational programs.

### **Essay topics**

1. Types and evaluation of biomedical data.
2. Collection and primary processing of biomedical data.
3. Evaluation of biomedical data regarding species and quality.
4. Methods for assessing the objectivity of medical information.

5. Methods for assessing the reliability of medical information using modern computer applications.
6. Application of modern information technologies in the healthcare system.
7. Comparative characteristics of the most commonly used hardware in modern healthcare.
8. Ways to apply the results of medical information in medical institutions.
9. Influence of the results of medical information on the speed of solving the problem in modern conditions.
10. The use of modern hardware in the treatment of the most severe diseases.

### **Guidelines for writing and designing an abstract**

An abstract is a creative activity of a master student, which reproduces in its structure research activities to solve theoretical and applied problems in a certain branch of scientific knowledge. Because of this, term paper is the most important component of the educational process in higher education.

The abstract, being a model of scientific research, is an independent work in which a master's student, graduate student, applicant solves a problem of a theoretical or practical nature, applying the scientific principles and methods of this branch of scientific knowledge. The result of this scientific search may have not only subjective, but also objective scientific novelty, and therefore can be presented for discussion by the scientific community in the form of a scientific report or message at a scientific and practical conference, as well as in the form of a scientific article.

The abstract is carried out under the guidance of a supervisor and involves the acquisition of skills in building business cooperation based on ethical standards for the implementation of scientific activities. Purposefulness, initiative, disinterested cognitive interest, responsibility for the results of one's actions, conscientiousness, competence are personality traits that characterize the subject of research activities that correspond to the ideals and norms of modern science.

An abstract is an independent educational and research activity of a master student, postgraduate student and applicant. The supervisor provides advisory assistance and evaluates the process and results of activities. He provides an approximate topic of abstract papers, clarifies the problem and the topic of research together with the undergraduate, helps to plan and organize research activities, appoints the time and the minimum number of consultations. The supervisor accepts the text of the abstract for verification at least ten days before the defense.

**Execution Criteria:** Requirements for the design and implementation of the abstract:



- the volume of the abstract should be within 10-15 printed pages (appendices to the work are not included in the volume of the abstract);
- when developing an abstract, it is recommended to use 8-10 different sources
- the abstract must be executed competently, in compliance with the culture of presentation;
- in the course of the presentation of the text, there should be references to the literature used;
- correct bibliography.

The structure of the abstract should include a title page, a table of contents (a sequential presentation of sections of the abstract indicating the page from which it begins), an introduction (formulating the essence of the problem under study, determining the relevance, goals and objectives of the abstract), the main part (each section of this part of the abstract evidently reveals a separate problem or one of its sides, is a logical continuation of the previous one; this part can contain tables, diagrams, graphs, figures, etc.), conclusion (summarizes or gives a generalized conclusion on the topic of the abstract, recommendations are offered), bibliography.

**Delivery deadlines:** at the last cycle.

#### **Abstract Evaluation Criteria**

- 100-86 points are given to the student if the student expressed his opinion on the formulated problem, argued it, accurately defining its content and components. The data of domestic and foreign literature, statistical information, information of a regulatory nature are given. The student knows and owns the skill of independent research work on the research topic; methods and techniques for analyzing the theoretical and / or practical aspects of the area under study.

- 85-76 - points - the work is characterized by semantic integrity, coherence and consistency of presentation; no more than 1 mistake was made when explaining the meaning or content of the problem. For argumentation, data of domestic and foreign authors are given. Demonstrated research skills and abilities. There are no actual errors related to understanding the problem.

- 75-61 points - the student conducts a fairly independent analysis of the main stages and semantic components of the problem; understands the basic foundations and theoretical justification of the chosen topic. The main sources on the topic under consideration are attracted. No more than 2 errors were made in the sense or content of the problem.

- 60-50 points - if the work is a retold or completely rewritten source text without any comments or analysis. The structure and theoretical component of the topic is not disclosed. Three or more than three errors were made in the semantic content of the problem being disclosed.

If the abstract meets all the requirements for design and content, then the student receives a maximum of 100 points for its implementation. If the abstract is made with minor flaws, such as using fewer sources or not fully disclosing certain issues, then the student receives 75-99 points. If the teacher believes that the topic is only half disclosed, but the main issues of the topic are still touched upon, only one or two sources are used, then the student receives 50-74 points. If the topic of the abstract is not disclosed, there are no references to the literature, and the student does not answer the questions asked on the abstract, then the score for the abstract is not set.

### **Criteria for evaluating the performance of independent work**

*Evaluation of independent work* is carried out according to the following criteria:

- the completeness and quality of the tasks performed;
- possession of methods and techniques of computer modeling in the issues under study, the use of software tools;
- the quality of the report design, the use of rules and standards for the design of text and electronic documents;
- use of data from domestic and foreign literature, Internet sources, regulatory information and best practices;
- absence of factual errors related to understanding the problem.

When evaluating the knowledge of masters, not only the amount of knowledge is taken into account, but, first of all, the quality of assimilation of the material, understanding the logic of the academic discipline, the ability to freely, competently, logically present what has been learned is evaluated, the ability to reasonably defend one's own point of view.

“Excellent” marks the answer to independent tasks, in which the material is systematically, logically and consistently presented.

The “good” rating implies knowledge of the material and the ability to draw independent conclusions, comment on the material presented; answer with minor flaws.

Assimilation of the material is assessed as "satisfactory" when the student has not studied some sections deeply enough, allows fuzzy formulations, and gives incomplete answers.

"Unsatisfactory" is put in the case when the student does not know a significant part of the educational material, makes significant mistakes; knowledge is unsystematic.

## **V. EDUCATIONAL AND METHODOLOGICAL SUPPORT FOR STUDENTS' INDEPENDENT WORK**

Independent work is defined as an individual or collective learning activity carried out without the direct guidance of a teacher, but according to his instructions and under his control. Independent work is a cognitive learning activity, when the sequence of a student's thinking, his mental and practical operations and actions depends and is determined by the student himself.

Independent work of students contributes to the development of independence, responsibility and organization, a creative approach to solving problems at the educational and professional levels, which ultimately leads to the development of the skill of independent planning and implementation of activities.

The purpose of independent work of students is to master the necessary competencies in their field of study, experience in creative and research activities.

Forms of independent work of students:

- work with basic and additional literature, Internet resources;
- self-acquaintance with the lecture material presented on electronic media in the library of an educational institution;
- preparation of abstract reviews of sources of periodicals, reference notes, predetermined by the teacher;
- search for information on the topic with its subsequent presentation to the audience in the form of a report, presentations;
- preparation for the implementation of classroom control work;
- performance of home control works;
- performance of test tasks, problem solving;
- drawing up crossword puzzles, schemes;
- preparation of reports for presentation at a seminar, conference;
- filling out a workbook;
- essay writing, term paper;
- preparation for business and role-playing games;
- compiling a resume;
- preparation for tests and exams;
- other kinds activities, organized And carried out educational institution and student self-government bodies.

#### IV. CONTROL OF ACHIEVEMENT OF COURSE OBJECTIVES

No. p / p	Controlled modules / sections / topics of the discipline	Codes and stages of formation of competencies		Appraisal tools - name	
				current control	intermediate certification
1	Module 1: Introduction to Health Informatics. Basic concepts of medical informatics. Features and types of medical information Theme 1.2	PC-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	offset Questions 1-5
			Can	UO-3, PR-11	
			owns	UO-2, PR-4	
2	Module 2 Topic 3,4,5	PC-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	offset Questions 6-10
			Can	UO-3, PR-11	
			owns	UO-2, PR-4	
3	Module 3. Processing and analysis of medical information Topic 6,7,8,9	PC-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	offset Questions 11-16
			Can	UO-3, PR-11	
			owns	UO-2, PR-4	

#### VII. REFERENCES AND INFORMATION AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

##### Main literature

1. Parfenova E.V. Information technologies [Electronic resource]: laboratory workshop / E.V. Parfenov. — Electron. text data. - M. : MISiS Publishing House, 2018. - 56 p. — 2227-8397. - Access mode:<http://www.iprbookshop.ru/78565.html>
2. Zhuravleva T.Yu. Information technologies [Electronic resource]: study guide / T.Yu. Zhuravlev. — Electron. text data. - Saratov: Higher education, 2018. - 72 p. — 978-5-4487-0218-1. - Access mode:<http://www.iprbookshop.ru/74552.html>
3. Medical informatics [Electronic resource]: textbook / V.P. Omelchenko, A.A. Demidov. - M. : GEOTAR-Media, 2016. - 528s. - <http://www.studentlibrary.ru/book/ISBN9785970436455.html>
4. Medical informatics [Electronic resource]: textbook / ed. ed. T.V. Zarubina, B.A. Kobrinsky. - M. : GEOTAR-Media, 2016. - 412 p.<http://www.studentlibrary.ru/book/ISBN9785970436899.html>
5. Govorova S.V. Information technologies [Electronic resource]: laboratory workshop / S.V. Govorova, M.A. Lapin. — Electron. text data. - Stavropol: North

Caucasian Federal University, 2016. - 168 p. — 2227-8397. - Access mode:<http://www.iprbookshop.ru/66066.html>

6. Information technology: Textbook / Gagarina L.G., Teplova Ya.O., Rumyantseva E.L.; Ed. Gagarina L.G. - M.: ID FORUM, SIC INFRA-M, 2015. - 320 p.: 60x90 1/16. - (Professional Education) (Binding 7BC) ISBN 978-5-8199-0608-8 - Access mode:<http://znanium.com/catalog/product/471464>

7. Information technologies [Electronic resource]: textbook /. — Electron. text data. - Stavropol: North Caucasian Federal University, 2014. - 254 p. — 2227-8397. - Access mode:<http://www.iprbookshop.ru/63092.html>

### **additional literature**

1. Basic and applied information technologies: Textbook / Gvozdeva V. A. - M.: ID FORUM, SIC INFRA-M, 2016. - 384 p.<http://lib.dvfu.ru:8080/lib/item?id=Znanium:Znanium-504788&theme=FEFU>

2. Medical informatics [Electronic resource]: textbook / V.P. Omelchenko, A.A. Demidov. - M. : GEOTAR-Media, 2016. - 528s. - <http://www.studentlibrary.ru/book/ISBN9785970436455.html>

3. Medical informatics [Electronic resource]: textbook / ed. ed. T.V. Zarubina, B.A. Kobrinsky. - M. : GEOTAR-Media, 2016. - 512c.<http://www.studentlibrary.ru/book/ISBN9785970436899.html>

4. Information technologies: textbook. allowance / G.N. Isaev. - 2nd ed., erased. - M.: Publishing house "Omega-L", 2013. - 464 p. Access mode:<http://www.studentlibrary.ru/book/ISBN9785370023996.html>

### **The list of resources of the information and telecommunication environment "Internet" necessary for the development of the discipline**

1. Patent database and patent search <http://www.freepatent.ru/>
2. Internet health portal <http://bio-x.ru/go.mail.ru/search?rf=e.mail.ru&fm=1&us=15&usln=3&usstr=health&usqid=7d41348ea69338f3&hasnavig=1&sbmt=1509229987234&q=health>
3. Site research <https://infopedia.su/4x3e87.html>; <https://dic.academic.ru/dic.nsf/ruwiki/663252>
4. SSAU electronic library - <http://library.sgau.ru>
5. NEB - <http://elibrary.ru>
6. <http://edu.znate.ru/docs/3997/index-94535-6.html>
7. Student Library <http://www.studmedlib.ru>
8. <http://www.rmj.ru/medjurnrus.htm>
9. Spravochno-legal system Consultant plus.

10. <http://vladmedicina.ru> Medical portal of Primorsky Krai  
eleven. <http://www.rosminzdrav.ru> Official website of the Ministry of Health of  
the Russian Federation  
12. <http://meduniver.com> Medical site about various fields of medicine

### **List of information technologies and software**

- Microsoft Office Professional Plus 2010;
- an office suite that includes software for working with various types of documents (texts, spreadsheets, databases, etc.);
- 7Zip 9.20 - free file archiver with a high degree of data compression;
- ABBY FineReader 11 - software for optical character recognition;
- Adobe Acrobat XI Pro - a software package for creating and viewing electronic publications in PDF format;
- ESET Endpoint Security - comprehensive protection of workstations based on Windows OS. Virtualization support + new technologies;
- WinDjView 2.0.2 is a program for recognizing and viewing files with the same name format DJV and DjVu.

## **VIII. METHODOLOGICAL INSTRUCTIONS FOR MASTERING THE DISCIPLINE**

The theoretical part of the discipline "Health Informatization" is revealed in lectures, since the lecture is the main form of education, where the teacher gives the basic concepts of the discipline.

The sequence of presenting the material in lectures is aimed at forming an indicative basis for students to subsequently master the material during independent work.

Practical classes of the course are held in all sections of the curriculum. Practical work is aimed at developing students' skills of independent research work. During practical classes, the master performs a set of tasks that allows you to consolidate the lecture material on the topic under study.

Active consolidation of theoretical knowledge is facilitated by the discussion of problematic aspects of the discipline in the form of a seminar and classes using active learning methods. At the same time, the development of skills of independent research activity in the process of working with scientific literature,

periodicals, the formation of the ability to reasonably defend one's point of view, listen to others, answer questions, and lead a discussion take place.

*Lecture classes* are focused on highlighting the main topics in each section of the course and are designed to orient students in the proposed material, lay the scientific and methodological foundations for further independent work of students.

Particularly significant for the professional training of students is independent work on the course. In the course of this work, students select the necessary material on the issue under study and analyze it. Independent work with literature includes such techniques as drawing up a plan, theses, abstracts, annotating sources, writing tests.

Students need to be introduced to the main sources, without which it is impossible to fully understand the issues of the course. Therefore, these sources are recommended for students to study at home and are included in the program.

Mastering the course should contribute to the development of skills for reasonable and independent assessments of facts and scientific concepts. Therefore, in all forms of knowledge control, especially when passing a test, attention should be paid to understanding the main problem field, to the ability to critically use its results and conclusions.

In the process of teaching disciplines, the following methods of active / interactive learning are used:

Lectures:

### **1. Problem lecture.**

The lecture begins with the teacher posing problems that are solved in the course of presenting the material. The answer to the problem requires thinking of the entire audience. During the lecture, students' thinking occurs with the help of the teacher creating a problem situation before they receive all the necessary information that constitutes new knowledge for them. Thus, students independently try to find a solution to the problem situation.

Educational problems are available according to their difficulty for students, they take into account the cognitive capabilities of students, proceed from the subject being studied and are significant for the assimilation of new material and personal development - general and professional.

The problem lecture provides creative assimilation by future specialists of the principles and patterns of the studied science, activates the educational and cognitive activity of students, their independent classroom and extracurricular work, the assimilation of knowledge and their application in practical classes.

**Practical lessons** focused on the most fundamental and problematic issues and are designed to stimulate the development of their own position on these topics.

In working with students, a variety of means, forms and methods of teaching (information-developing, problem-search) are used: the method of scientific discussion, a conference or a round table, an analysis of specific educational situations (case study).

### **Conference or round table**

When using this method, you can invite various specialists involved in the study of the problem under consideration or working on a topic studied by students. These can be scientists, economists, artists, representatives of public organizations, government agencies, etc.

Before such a meeting, the teacher invites students to put forward a problem of interest to them on this topic and formulate questions for their discussion. If students find it difficult, the teacher can suggest a number of problems and, together with the students, choose a more interesting one for them. Selected questions are transferred to the invited expert of the round table to prepare for the presentation and answers. At the same time, several specialists involved in the study of this problem can be invited to the "round table". In order for the round table meeting to be active and interested, it is necessary to encourage listeners to exchange views and maintain an atmosphere of free discussion.

When applying all these forms of classes, students get a real practice of formulating their point of view, comprehending the system of argumentation, that is, turning information into knowledge, and knowledge into beliefs and views.

The collective form of interaction and communication teaches students to formulate thoughts in a professional language, to speak orally, to listen, hear and understand others, to argue correctly and reasonably. Joint work requires not only individual responsibility and independence, but also self-organization of the work of the team, exactingness, mutual responsibility and discipline. At such seminars, the subject and social qualities of a professional are formed, the goals of training and educating the personality of a future specialist are achieved.

The features of collective mental activity are that there is a rigid dependence of the activity of a particular student on a fellow student; it helps to solve the psychological problems of the team; there is a "transfer" of action from one participant to another; self-management skills develop.

There are various forms of organizing and conducting this type of training, such as a press conference.



At the previous lesson, the teacher gives the task to students to individually answer the questions of the practical lesson and collectively discuss options for solving the same situation, which significantly deepens the experience of the trainees. Faced with a specific situation, the student must determine whether there is a problem in it, what it consists of, determine their attitude to the situation. At the same time, each student must, by getting used to the role of specific historical figures, analyze the causes, course and results of the events. The practical lesson begins with an introductory speech by the teacher, in which the problems for discussion are voiced. As the discussion proceeds, each of the students has the opportunity to get acquainted with the solutions, listen and weigh their many assessments, additions, changes, enter into a dialogue and discussion.

As the questions of the practical lesson are discussed, the analytical abilities of the trainees develop, contribute to the correct use of the information at their disposal, develop independence and initiative in decisions.

At the final stage of the lesson, the teacher, correcting the conclusions on the performances of students, draws general conclusions for each practical task and the overall result for the entire lesson.

#### **Method of scientific discussion**

The academic group is divided into two subgroups - generators and critics of ideas. Three more people stand out - expert analysts.

The practical lesson is implemented in four stages:

The first is preparatory (carried out 1-2 weeks before the practical session). The teacher instructs about the purpose, content, nature, rules of participation in the game. Student preparation includes:

- determination of the purpose of the lesson, specification of the educational task;
- planning the general course of the lesson, determining the time of each stage of the lesson;
- development of criteria for evaluating the proposals and ideas received, which will make it possible to purposefully and meaningfully analyze and summarize the results of the lesson.

Mutual criticisms and evaluations are strictly prohibited; they hinder the emergence of new ideas. You should refrain from actions, gestures that may be misinterpreted by other participants in the session. No matter how fantastic or incredible the idea put forward by any of the participants in the session, it should be met with approval. The more proposals put forward, the greater the likelihood of a new and valuable idea.

The second - the lesson begins with the fact that the generators of ideas quickly and clearly characterize the ruler, the situation in the country and express all proposals for solving the named problem;

Third - critics of ideas "attack" - select the most valuable, progressive of them, analyze, evaluate, criticize and include in the list of relevant assumptions that provide a solution to the problem;

Fourth - experts analyze and evaluate the activities of both subgroups, the significance of the ideas put forward.

The goal of the teacher is to organize collective mental activity to find non-traditional ways to solve problems, when discussing controversial issues, hypotheses, problematic or conflict situations.

When writing essays, it is recommended to independently find literature for it. The abstract reveals the content of the problem under study. Working on an essay helps to deepen the understanding of individual issues of the course, form and defend one's point of view, acquire and improve the skills of independent creative work, and conduct active cognitive work.

An interview and a survey are conducted to conduct ongoing monitoring and intermediate certification.

## **IX. LOGISTICS AND TECHNICAL SUPPORT OF THE DISCIPLINE**

The educational process in the discipline is carried out in the lecture, computer classes of the building of the School of Biomedicine of the FEFU campus, equipped with computers and multimedia systems, with a connection to the FEFU corporate network and the Internet, the simulation Center of the FEFU School of Biomedicine.

The material and technical support for the implementation of the discipline includes classrooms for lectures and practical classes, equipped with multimedia support and corresponding to sanitary and contrary rules and regulations.

In order to provide special conditions for the education of people with disabilities and people with disabilities in FEFU, all buildings are equipped with ramps, elevators, lifts, specialized places equipped with toilets, information and navigation support signs.

Name of special rooms and rooms for independent work	Equipment special premises and spaces for independent work	List of licensed software. Details of the supporting document
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<p>690922, Primorsky Territory, Vladivostok, Russian Island, Saperny Peninsula, Ayaks village, 10, School of Biomedicine, room M 422, area 158.6 m<sup>2</sup></p>	<p>Multimedia Audience:  Motorized Screen 236*147cm  Trim Screen Line; Projector DLP, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; document camera CP355AF Avervision, video camera MP-HD718 Multipix; Subsystem of specialized equipment fastenings CORSA-2007 Tuarex; Video switching subsystem: Audio switching and sound amplification subsystem: power amplifier, wireless LAN based on 802.11a/b/g/n 2x2 MIMO(2SS) access points.</p>	
<p>690922, Primorsky Territory, Vladivostok, Russian Island, Saperny Peninsula, Ayaks village, 10, School of Biomedicine, room M 419, area 74.9 m<sup>2</sup></p>	<p>Multimedia Audience:  Motorized Screen 236*147cm  Trim Screen Line; Projector DLP, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; document camera CP355AF Avervision, video camera MP-HD718 Multipix; Subsystem of specialized equipment fastenings CORSA-2007 Tuarex; Video switching subsystem: Audio switching and sound amplification subsystem: power amplifier, wireless LAN based on 802.11a/b/g/n 2x2 MIMO(2SS) access points.</p>	
<p>690922, Primorsky Territory, Vladivostok, Russian Island, Saperny Peninsula, Ayaks settlement, 10, room M612, area 47.2 m<sup>2</sup></p>	<p>Computer class for 22 workplaces:  HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, W, usb kbd/ mse, Win7Pro(64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty (25 pcs.)</p>	
<p>Reading rooms of the FEFU Scientific Library with open access to the fund (building A - level 10)</p>	<p>HP ProOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, BT, usb kbd/ mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty  Internet access speed 500 Mbps.  Workplaces for people with disabilities are equipped with Braille displays and printers; equipped with: portable devices for reading flat-print texts, scanning and reading machines, a video enlarger with the ability to regulate color spectra; magnifying electronic loupes and ultrasonic markers</p>	

## IX. VALUATION FUNDS

### FOS passport in the discipline "Bioinformatics"

Task type	Code and name of professional competence (result of development)	Code and name of the indicator of achievement of competence
research	PC-1 Ability to calculate, evaluate and analyze indicators characterizing the activities of a medical organization, and indicators characterizing the state of public health	PC-1.1 Knows the principles of collecting and processing information PC-1.2 Can create a data matrix, code the material PC-1.3 Owns statistical methods of data processing, including using information and analytical systems and the information and telecommunication network "Internet"

Code and name of the indicator of achievement of competence	Name of the assessment indicator (the result of training in the discipline)
PC-1.1 Knows the principles of collecting and processing information	Knows the principles of collecting, processing, analyzing and providing information Able to collect, process, analyze and provide information in their professional activities Possesses the skill of collecting, processing, analyzing and providing information in their professional activities
PC-1.2 Can create a data matrix, code the material	Knows how to encode information Able to create a data matrix, conduct material coding Proficient in coding material
PC-1.3 Owns statistical methods of data processing, including using information and analytical systems and the information and telecommunication network "Internet"	Knows the basic methods of data processing, including using information and analytical systems and the information and telecommunications network "Internet" Ability to process and present data Owns statistical methods of data processing, including using information and analytical systems and information and telecommunications network "Internet"

### Monitoring the achievement of course goals

No. p / p	Controlled modules / sections / topics of the discipline	Codes and stages of formation of competencies	Appraisal tools - name	
			current control	intermediate certification

1	Module 1: Introduction to Health Informatics. Basic concepts of medical informatics. Features and types of medical information Theme 1.2	PC-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	offset  Questions 1-5
			Can	UO-3, PR-11	
			owns	UO-2, PR-4	
2	Module 2 Topic 3,4,5	PC-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	offset  Questions 6-10
			Can	UO-3, PR-11	
			owns	UO-2, PR-4	
3	Module 3. Processing and analysis of medical information Topic 6,7,8,9	PC-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	offset  Questions 11-16
			Can	UO-3, PR-11	
			owns	UO-2, PR-4	

### **Methodological recommendations that determine the procedures for evaluating the results of mastering the discipline**

**Current certification of students.** It is carried out in accordance with the local regulations of the Far Eastern Federal University and is mandatory. It is carried out in the form of control measures: the defense of a test, an interview to assess the actual results of students' learning and is carried out by a leading teacher.

The objects of assessment are:

- academic discipline (activity in the classroom, the timeliness of the implementation of various types of tasks, attendance at all types of classes in the discipline being certified);
- the degree of assimilation of theoretical knowledge (survey);
- the level of mastery of practical skills and abilities in all types of educational work (colloquium);
- results of independent work.

**Intermediate certification of students.** It is carried out in accordance with the local regulations of the Far Eastern Federal University and is mandatory. Provides for the accounting of the results of all stages of the development of the course. Provided that two stages of the current attestation have been successfully passed, the student is given an intermediate attestation (test, exam).

**Test and examination materials.** When assessing students' knowledge, intermediate control takes into account the amount of knowledge, the quality of

their assimilation, understanding the logic of the academic discipline, the place of each topic in the course. The ability to freely, competently, logically coherently present what has been studied, the ability to reasonably defend one's own point of view are assessed.

*Certification* students in the discipline "Informatization of healthcare» is carried out in accordance with the local regulations of the FEFU in the form of a test.

## **I. Evaluation tools for certification**

### **Questions for offset**

1. Classification of computer networks on a territorial basis: LAN, MAN, WAN networks.
2. Internet. Internet addressing.
3. Internet Services: e-mail, mailing lists, newsgroups, world wide web WWW, file transfer service (FTP), ICQ.
4. TCP/IP protocol stack.
5. Search for information on the Internet.
6. Popular web browsers. Search engines.
7. Major foreign search engines.
8. Basic Internet protocols: http, telnet, SMTP, HTTP, FTP, POP. Email.
9. Data protection. Information security methods: cryptography, electronic signature, authentication, certification of Web sites.
10. Saving Web pages. Features of saving pages containing frames.
11. HTML. Interpretation of HTML tags. Basic structural elements of HTML.
12. Headings. paragraphs. logical partitions. Display preformatted text.
13. Lists: bulleted, numbered.
14. Create hyperlinks.
15. Adding graphic elements.
16. Tables. Table tag attributes.

### **Criteria for grading a student in the test in the discipline**

#### **"Bioinformatics"**

<b>Credit score</b>	<b>Requirements for the formed competencies</b>
"passed"	The grade "passed" is given to the student if he knows the material well, presents it competently and to the point, avoids significant inaccuracies in answering the question, correctly applies the theoretical provisions in solving practical issues and tasks, possesses the necessary skills and techniques for their implementation

"not counted"	The grade "not passed" is given to a student who does not know a significant part of the program material, makes significant mistakes, uncertainly, with great difficulty answers the questions posed. As a rule, the "failed" mark is given to students who cannot continue their studies without additional classes in the relevant discipline.
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## Interview Questions

### Approximate topics of control questions:

1. What is "Medical Informatics"?
2. Subject, object and purpose of medical informatics.
3. What is "Information" and "Medical Information"?
4. How is the biosignal converted into medical information?
5. What are the types of health information?
6. What is "objective and subjective information"?
7. What are the ways to obtain reliable medical information?
8. What components ensure the degree of accessibility of medical information?
9. How is information classified according to the degree of relevance? Explain.
10. Describe the health information measures.
11. Describe the main functions of the MS Excel software application.
12. List ways to introduce functions.
13. List the main stages of charting in the Microsoft Excel software application.
14. Analyze changes in clipboard input in different versions of MS Excel.
15. With what arithmetic sign the input of the function begins.
16. How to produce the data signature in the diagram.
17. List the types of drawings that can be inserted into the worksheet of the MS Excel software application.
18. Tell us about the features of working with pictures in the Microsoft Excel software application. What is Health Informatization?
19. What is the main goal of healthcare informatization?
20. List the functions of healthcare informatization.
21. List the tasks of the development of healthcare informatization?
22. The current state of health care informatization in Russia.
23. List the main problems of healthcare informatization.

### Evaluation tools for current certification

**Control tests** are intended for students studying the course "Health Informatization".

When working with tests, it is proposed to choose one answer option from three to four offered. At the same time, the tests are not the same in their complexity. Among the proposed there are tests that contain several options for correct answers. The student must indicate all the correct answers.

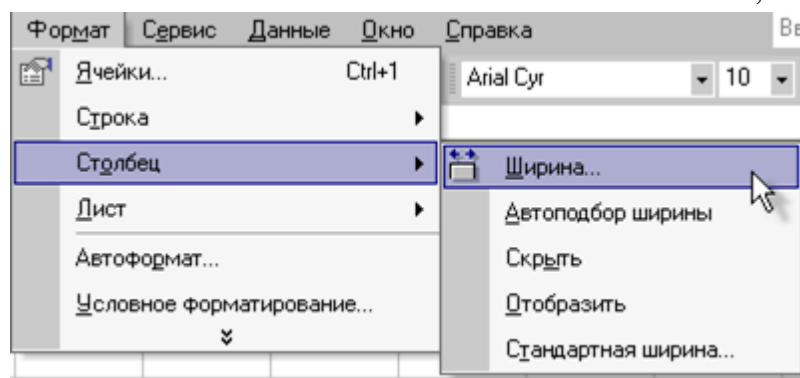
Tests are designed for both individual and collective decision. They can be used in both classroom and self-study. The selection of tests necessary for the control of knowledge in the process of intermediate certification is made by each teacher individually.

## TASKS FOR TEST CONTROL OF KNOWLEDGE

1. Change the width of column A like this:

o click on any cell in column A;

o execute the command Format - Column - Width;



2. Auto-format the column width. For this:

o select cells A1:D4, for which place the cursor on cell A1 and, without releasing the left mouse button, drag it to cell D4;

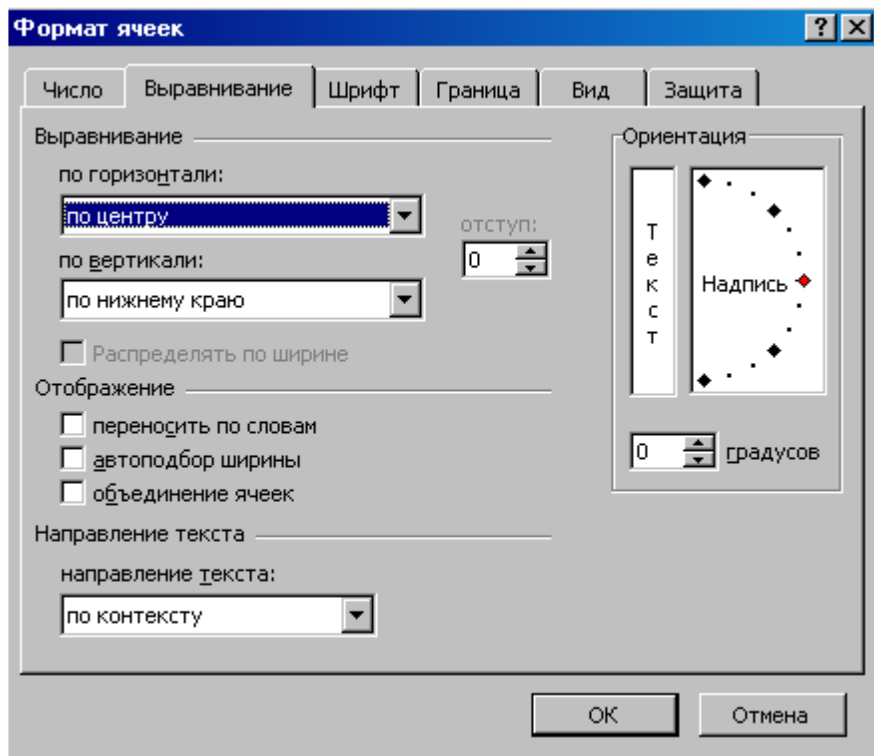
o run the Format - Column - AutoFit command and click the OK button;

3. Set text alignment in cells:

o select the block of cells B1:D4;

o select the command Format - Cells - Alignment and set the alignment to the center, click OK.





**1. The SMTP protocol is for...**

- a) receiving e-mail;
- b) sending email;
- c) Web browsing.

**2.The FTP service on the Internet is intended for:**

- a) to create, receive and transmit Web pages;
- b) for remote control of technical systems;
- c) to receive and transmit files of any format;
- d) to ensure the operation of teleconferencing.

**3. The bandwidth of the information transmission channel is measured in (several answers):**

- a) bit/s;
- b)Mbps;
- c) Mbps;
- d) KB/s;
- e) byte;
- f) MB

**4. Routing protocol (IP) provides:**

- a) control of data transmission equipment and communication channels;

- b) preservation of mechanical, functional parameters of physical communication in a computer network;
- c) data interpretation and preparation for the user level;
- d) delivery of information from the sender's computer to the recipient's computer;
- e) splitting files into IP packets during transmission and reassembling files during reception.

**5. The three main requirements for computer networks are ...**

- a) productivity;
- b) capacity;
- c) parallelism;
- d) reliability;
- e) throughput;
- f) integrability

**6. Domain is ...**

- a) unit of measure of information;
- b) the name of the program for communication between computers;
- c) part of the address that specifies the address of the user's computer on the network;
- d) the name of the device that communicates between computers.

**7. A teleconference is ...**

- a) exchange of letters in global networks;
- b) hyperlinked information system;
- c) information exchange system between computer network subscribers;
- d) a service for receiving and transmitting files of any format.

**8. A computer that provides its resources to other computers when working together is called:**

- a) an adapter;
- b) a switch;
- c) workstation;
- d) server.

**9. Highlight the three most important methods for protecting information from illegal distribution:**

- a) encryption;
- b) setting special file attributes;
- c) automatic redundancy;
- d) authentication;
- e) antivirus

**10. A compressed image of the source code is commonly used ...**

- a) as a key to encrypt text;
- b) as a public key in symmetric algorithms;
- c) as a result of encrypting text to send it over an insecure channel;
- d) to create a digital signature

**11. What tag is used to create hypertext?**

- a) <B>...</B>;
- b) <BR>... ;
- c) <A>...</A>;
- d) <TD>...</TD>

**12. What attribute sets the background color of a document?**

- a) bgcolor
- b) background;
- c) color;
- d) there is no correct answer

**13. How to separate text with a horizontal bar?**

- a) <HR>;
- b) <BR>;
- c) <A>;
- d) <EM>

**14. How do I italicize text in an HTML document?**

- a) using the <B> tag;
- b) using the <I> tag;
- c) using the <U> tag

**15. The title definition must be contained within the tag:**

- a) <Title>...</Title>;
- b) <Head>...</Head>;
- c) <Br>;
- d) <B>...</B>

**16. Internet services do not include ...**

- a) Electronic mail (e-mail);
- b) Data Transfer Service (FTP);
- c) HTML (Hyper Text Markup Language);
- d) World Wide Web.

**17. The program code in HTML is ...**

- a) a plain text file created with a text editor;
- b) a program written in a special programming language;
- c) a program written in Internet Explorer.

**18. What does the BORDER attribute define on a TABLE markup element?**

- a) cell spacing;
- b) cell width;
- c) border width.

**19. Tag is:**

a) an instruction to the browser indicating how the text should be displayed;  
b) text that uses special characters;  
c) a pointer to another file or object;  
d) an escape sequence for writing Web documents in hypertext markup language.

**20. To insert an image into an HTML document, use the command:**

- a) `` ;
- b) `<img background="fig.jpg">` ;
- c) `<a href="pic.jpg">`

**21. What will be displayed on Web page when writing the following text on the page: `<BODY BGCOLOR="BLACK" TEXT="YELLOW"> AAA <FONT COLOR="RED"> BBB</FONT> </BODY>?`**

- a) black background, "AAA, BBB" - yellow text;
- b) black background, "AAA, BBB" - red text;
- c) black background, "AAA" - yellow, "BBB" - red.

**22. HTML is...**

- a) hypertext transfer protocol;
- b) hypertext markup language;
- c) a group of messages on a specific topic.

**23. The Internet Explorer app allows...**

- a) download newsgroups using the NNTP protocol;
- b) download Web pages via HTTP protocol and files via FTP protocol;
- c) chat using the IRC protocol;
- d) transfer files via FTP

**24. One of the search engines on the Internet is ...**

- a) Gov.ru
- b) Lycos;
- c) THE BAT;
- d) File Search.

**25. An electronic digital signature of a document allows the recipient ...**

a) only make sure that the document has not been modified at the time of transmission;

b) only verify the validity of the document, but do not verify the authenticity of the document;

c) either verify that the sender of the document is correct, or verify that the document has not been altered during transmission;

d) establish the absence of distortion of information in the electronic document and verify that the signature belongs to the owner

**26. The form of writing an IP address is a record of the form: xxx.xxx.xxx, where xxx is ...**

a) decimal numbers from 0 to 256;

b) decimal numbers from 0 to 255;

c) binary code;

d) letters of the Latin alphabet.

**27.HTTP is...**

a) hypertext transfer protocol;

b) hypertext markup language;

c) a group of messages on a specific topic.

**28. To create a numbered list, use the tag:**

a) <OL>;

b) <UL>;

c) <DL>.

**29.Specify the correct path to the file:**

a) <IMG SRC="<http://www.uprlnt.ru/picture/f11el.gif>">;

b) <IMG SRO="<http://www.uprlnt.ru/picture/f11el.gif>">;

c) <IMG SRC="<http://www.uprlnt.ru/picture/f11el.gif>">.

**30.TR tag defines:**

a) table row;

b) table column;

c) table border.

**31. Hyperlinks on a Web page can provide a transition ...**

a) only within a given Web page;

b) only on Web pages of this server;

c) to any Web page of the given region;

d) to any Web page of any Internet server.

**32. The correct order of the tags is:**

a) <tag1><tag2><tag3> ... </tag1></tag2></tag3>;

b) <tag1>...</tag1><tag3><tag1>...</tag3></tag1>;

c) <tag1><tag2><tag3> ... </tag3></tag2></tag1>;

d) <tag1>...</tag2><tag3> ... </tag3><tag2>...</tag1>.

**33. What will be displayed on the Web page when writing the following text on the page: <TABLE WIDTH=50%> <TR> <TD> AAA </TD> </TR> <TR> <TD> BBB </TD>< /TR> </TABLE>?**

- a) table with 1 row and 1 column;
- b) a table with 1 row and 2 columns;
- c) a table with 2 rows and 1 column.

**34. A hyperlink is given by a tag:**

- a) <a src="file.html"> text </a>;
- b) <a="http://www.da.ru"> text </a> ;
- c) <a href="file.html"> text </a> .

**35. What does the <ALT> attribute of the <IMG> tag mean?**

- a) frame width;
- b) the source of the picture;
- c) the height of the picture.

**36. ALIGN attribute is used for:**

- a) alignment of objects on the screen;
- b) specifying the dimensions of the drawing;
- c) to set the border thickness of the picture.

### **Test Evaluation Criteria**

The results of the test tasks are evaluated by the teacher on a five-point scale for attestation or according to the "pass" - "fail" system. The grade "excellent" is given with the correct answer to more than 90% of the tests proposed by the teacher. Rating "good" - with the correct answer to more than 70% of the tests. Grade "satisfactory" - with the correct answer to 50% of the proposed tests.