



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 the EP

(Signed)

December 6, 2022

Y.S. Khotimchenko  
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Director of the Department of Pharmacy and Pharmacology

(Signed)

December 6, 2022

E.V. Khozhaenko

(Surname)

CURRICULUM OF THE ACADEMIC 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 6 p.m.

Practical training 36 hours

The total hours of classroom load are 54 hours.

Self-study 90 hours.

Credit: Semester 2

The work program is drawn up in accordance with the requirements of the Federal State Educational Standard for the field of training 32.04.01 Public Health, approved by the order of the Ministry of Education and Science of the Russian Federation dated 31.05.2017 No. 485.

The work program was discussed at the meeting of the Department of Pharmacy and Pharmacology, minutes No. 4 dated December 6, 2022.

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

Authors: Ph.D., Associate Professor Rasskazova V.N.

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1. The work program was revised at a meeting of the Department/Department/Division (implementing the discipline) and approved at a meeting of the Department/Department/Division (Graduating Structural Unit), minutes dated " \_\_\_\_ " \_\_\_\_\_ 2022. № \_\_\_\_\_
2. The work program was revised at the meeting of the Department/Department/Division (implementing the discipline) and approved at the meeting of the Department/Department/Division (Graduating Structural Unit), Minutes dated " \_\_\_\_ " \_\_\_\_\_ 2022. № \_\_\_\_\_
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## I. Goals and objectives of mastering the discipline:

Purpose:

Based on the study of the basic concepts of the discipline, to train a specialist with knowledge and skills that allow the use of computer applications, means of information support for medical decisions, automated medical and technological systems to solve problems of medicine and healthcare.

Tasks:

- To increase the level of professional skills in the field of health informatization;
- explore additional possibilities of cybernetics and computer science;
- to study the technological levels of information processing in medicine;
- to identify ways and means of applying the acquired knowledge in the practical activities of medical personnel;
- master the 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 mastering)	Code and name of the competency indicator
Research & Development	PC-1 Ability to calculate, assess and analyze indicators characterizing the activities of a medical organization and indicators characterizing the state of health of the population	PC-1.1 Knows the principles of information collection and processing PC-1.2 Able to create a data matrix, encode material PC-1.3 Proficient in statistical methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet"

Code and name of the competency indicator	Name of the assessment indicator (the result of learning in the discipline)
PC-1.1 Knows the principles of information collection and processing	Knows the principles of collecting, processing, analyzing, and providing information Able to collect, process, analyze and provide information in his/her professional activities Possesses the skill of collecting, processing, analyzing and providing information in their professional activities
PC-1.2 Able to create a data matrix, encode material	Knows how to encode information Able to create a data matrix, encode the material Proficient in coding material

PC-1.3 Proficient in statistical methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet"	Knows the basic methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet" Able to process data and present it Proficient in statistical methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet"
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For the formation of the above competencies within the framework of the discipline "Bioinformatics", the following methods of active/interactive learning are used: lectures - conferences, problem lectures, lectures-visualizations; practical classes - dispute, round table (preparation and discussion of abstracts).

## II. Labor intensity of the discipline and types of training in the discipline

The labor intensity of the discipline is 4 credits (144 academic hours).  
(1 credit corresponds to 36 academic hours)

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

Designation	Types of Study Sessions and Student Work
Lek	Lecture
Lek electr.	
Ave	Practical exercises
Pr electr.	
WED:	Student's independent work 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

Structure of the discipline:

The form of study is full-time.

№	Section Name Discipline	S e m e s t e r	Number of hours by type of training and work of the student					Forms of intermediate attestation	
			Lek	Lab	Ave	OK	WE D		Contr ol
	Module 1. Introduction to Medical Informatics. Basic Concepts of Medical Informatics. Features and types of medical information	2	4		8				

Module 2. Leveraging MExcel's Capabilities in Medical Data Processing	2	8		12				
Module 3. Processing and analysis of medical information	2	6		16				
Total:	2	18	-	36	-	90		Credit

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

Lectures 6 p.m.

Topic 1. Basic Concepts of Medical Informatics (2 hours).

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

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

Topic 4. Health Informatization 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 Health Care Informatization (2 hours).

Topic 5. Hardware and software for health care informatization. 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 health care informatization. Informational activity of medical workers (2 hours).

Topic 7. Automation in healthcare. E-learning systems (e-learning systems). Distance learning. Automated Learning Systems (AOC) (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 informatization of health care in the Russian Federation (2 hours).

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

Practical exercises

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

*Module 1. Introduction to Health Informatics. Basic Concepts of Medical Informatics. Features and Types of Medical Information (8 hours)*

Class 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 MS Excel in Medical Data Processing (12 hours)*

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

Class 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 addressing of information data in MS Excel.

Class 5. Ways to eliminate and work on errors in MS Excel (4 hours). Input of information data in MS Excel according to the conditions of the task. Building functions in MS Excel according to the conditions of the task. Use of different methods of charting in MS Excel. Implementation of your own information databases in MS Excel, taking into account production tasks.

*Module 3. Processing and Analysis of Medical Information (16 hours)*

Class 6. Reliability of medical information (4 hours). Methods for determining credibility. Availability of medical information. How to get it.

Class 7. Medical Information Measures (4 hours). Informatization of health care. Goals, Objectives and Functions of Health Care Informatization.

Class 8. Information support according to the goals of health informatization (4 hours).

Development of health care informatization. Problems of Medical Informatics.

Class 9. Information training of medical personnel (4 hours). Current state of informatization of health care in the Russian Federation.

#### **Schedule of independent work in the discipline**

<b>№ p/n</b>	<b>Due Date/Deadlines</b>	<b>Type of independent work</b>	<b>Approximate time limits for execution</b>	<b>Form of control</b>
1	Week 1-3	Preparation of abstracts	30 hours	Protection

2	Week 4-6	Preparing a presentation	30 hours	Protection
3	Week 7-9	Preparation for the test	30 hours	Credit

Students' independent work consists of preparing for practical classes, working on recommended literature, writing reports on the topic of the seminar, preparing presentations and essays.

The teacher offers each student individual and differentiated assignments. Some of them can be carried out in a group (for example, the preparation of a report and a presentation on the same topic can be done by several students with a division of their responsibilities - one prepares the scientific and theoretical part, and the second analyzes the 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 a discussion constitute the content of the master's independent work. Lecture notes, professional literature, educational and methodological support of the discipline can become material for preparation. Forms of current control: survey, group discussion, control tasks, presentation of the report.

One of the necessary components of successful completion 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 relevant section of the discipline. For the methodological support of the development of the discipline, the department develops teaching aids (recommendations and instructions for students and teachers, etc.), where the goals and methods of conducting classes are described in detail.

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

### **Abstract Topics**

1. Types and evaluation of biomedical data.
2. Collection and primary processing of biomedical data.

3. Evaluation of biomedical data in terms of species and quality.
4. Methods of assessing the objectivity of medical information.
5. Methods of assessing the reliability of medical information using modern computer applications.
6. Application of modern information technologies in the health care system.
7. Comparative characteristics of the most frequently used hardware of modern health care.
8. Ways to apply the results of medical information in medical institutions.
9. Influence of the results of medical information on the speed of problem solving in modern conditions.
10. Use of modern hardware in the treatment of the most severe diseases.

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

An essay is a creative activity of a Master's student, which reproduces in its structure research activities to solve theoretical and applied problems in a certain branch of scientific knowledge. For this reason, coursework is the most important component of the educational process in higher education.

An essay, 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 research can 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 a report 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 the supervisor and involves the acquisition of skills in building business cooperation based on the ethical standards of scientific activity. Purposefulness, initiative, disinterested cognitive interest, responsibility for the results of one's actions, conscientiousness, competence are the personal qualities that characterize the subject of research activities that correspond to the ideals and norms of modern science.

An essay is an independent educational and research activity of a master's student, a graduate student and a job seeker. The supervisor provides advisory assistance and evaluates the process and results of the activities. He provides an approximate topic of abstract work, clarifies the problem and 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 review at least ten days before the defense.



**Criteria:** Requirements for the preparation and implementation of the abstract:

- the volume of the abstract should be within 10-15 printed pages (annexes 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 should be written competently, in compliance with the culture of presentation;
- In the course of the text, there should be references to the literature used;
- properly format the bibliography.

The structure of the abstract should include a title page, a table of contents (a **sequential presentation of the sections of the abstract with an indication of the page from which it begins**), an introduction (formulation of the essence of the problem **under study, determination of the relevance, purpose 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; in this part, they can tables, schemes, graphs, figures, etc.), **conclusion** (summarizing or giving a generalized conclusion on the topic of the abstract, offering recommendations), **list of references** should be given.

**Deadlines:** in the last cycle lesson.

#### **Criteria for evaluating the abstract**

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

- 85-76 points - the work is characterized by semantic integrity, coherence and consistency of presentation; No more than 1 mistake was made in explaining the meaning or content of the problem. For argumentation, the data of domestic and foreign authors are given. Research skills and abilities have been demonstrated. There are no factual 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 involved. No more than 2 errors were made in the meaning or content of the problem.

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

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

### **Criteria for Evaluating the Performance of Independent Work**

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

- completeness and quality of completed tasks;
- • Mastery of methods and techniques of computer modeling in the issues under study, the use of software tools;
- the quality of the report, the use of rules and standards for the preparation of text and electronic documents;
- use of data from domestic and foreign literature, Internet sources, regulatory and legal information and best practices;
- No factual errors related to understanding the problem.

When assessing 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 of the logic of the academic discipline, the ability to freely, competently, logically coherently present what has been studied, the ability to defend one's own point of view with arguments.

The answer to independent tasks, in which the material is presented systematically, logically and consistently, is graded as "excellent".

A "good" assessment presupposes knowledge of the material and the ability to draw independent conclusions, comment on the material presented; A response with minor flaws.

"Satisfactory" is the assessment of the assimilation of the material when the student has not studied some sections deeply enough, allows unclear formulations, gives incomplete answers.

"Unsatisfactory" is given in the case when the student does not know a significant part of the educational material, makes significant mistakes; Knowledge is haphazard.

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

Independent work is defined as individual or collective learning activities carried out without the direct supervision of the teacher, but according to his tasks and under his supervision. Independent work is a cognitive learning activity, when the sequence of the 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 students' independent work is to acquire the necessary competencies in their field of training, experience in creative and research activities.

Forms of independent work of students:

- work with basic and additional literature, Internet resources;
- independent acquaintance with the lecture material presented on electronic media in the library of the educational institution;
- preparation of abstract reviews of periodical sources, 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 classroom tests;
- doing home tests;
- performing test tasks, solving problems;
- compilation of crosswords, schemes;
- preparation of reports for presentation at a seminar or conference;
- filling out a workbook;
- writing essays, term papers;
- preparation for business and role-playing games;
- resume writing;
- preparation for tests and exams;
- other Views Activities Organized and carried out by the educational institution and student self-government bodies.

## IV. MONITORING THE ACHIEVEMENT OF THE COURSE OBJECTIVES

Item No.	Supervised modules/sections/topics of the discipline	Codes and Stages of Competency Formation		Valuation Tools – Name	
				Current control	Intermediate Attestation
1	Module 1. Introduction to Health Informatics. Basic Concepts of Medical Informatics. Features and types of medical information Topic 1.2	PP-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	Credit  Questions 1-5
			Can	UO-3, PR-11	
			Owens	UO-2, PR-4	
2	Module 2. Leveraging MExcel's Capabilities in Medical Data Processing Topic 3,4,5	PP-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	Credit  Questions 6-10
			Can	UO-3, PR-11	
			Owens	UO-2, PR-4	
3	Module 3. Processing and analysis of medical information Topic 6,7,8,9	PP-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	Credit  Questions 11-16
			Can	UO-3, PR-11	
			Owens	UO-2, PR-4	

## VII. LIST OF REFERENCES AND INFORMATIONAL AND METHODOLOGICAL SUPPORT OF THE DISCIPLINE

### Reference citations

1. Parfenova E.V. Informatsionnye tekhnologii [Information Technologies]: Laboratory Practicum / E.V. Parfenova. — Electron. Text data. — M. : MISIS Publishing House, 2018. — 56 p. — 2227-8397. — Mode of access: <http://www.iprbookshop.ru/78565.html>

2. Zhuravleva T.Y. Informatsionnye tekhnologii [Information Technologies]: Textbook. — Electron. Text data. — Saratov: Vuzovskoe obrazovaniye, 2018. — 72 p. — 978-5-4487-0218-1. - Mode of access: <http://www.iprbookshop.ru/74552.html>

3. Medical Informatics [Elektronnyi resurs]: uchebnik / V.P. Omelchenko, A.A. Demidova. Moscow: GEOTAR-Media, 2016. – 528 p. (in Russian). - <http://www.studentlibrary.ru/book/ISBN9785970436455.html>

4. Medical Informatics [Elektronnyi resurs]: uchebnik [Elektronnyi resurs]: uchebnik [Elektronnyi resurs]: uchebnik [Elektronnyi resurs]: uchebnik [Elektronnyi resurs]: uchebnik [Elektronnyi resurs]: uchebnik / pod obsh. red. T.V. Zarubina, B.A. Kobrinskogo. -



2. Health Online Portal <http://bio-x.ru/go.mail.ru/search?rf=e.mail.ru&fm=1&us=15&usln=3&ustr=healthcare&usqid=7d41348ea69338f3&hasnavig=1&sbmt=1509229987234&q=healthcare>
3. Website scientific 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. Legal reference system Consultant Plus.
10. <http://vladmedicina.ru> Medical portal of Primorsky Krai
11. <http://www.rosminzdrav.ru> Official website of the Ministry of Health of the Russian Federation
12. <http://meduniver.com> Medical website 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 high data compression ratio;
- ABBYY FineReader 11 is a software for optical character recognition;
- Adobe Acrobat XI Pro is a software package for creating and viewing electronic publications in PDF format;
- ESET Endpoint Security is a comprehensive protection for Windows-based workstations. Virtualization support + new technologies;
- WinDjView 2.0.2 is a program for recognizing and viewing files with the DJV and DjVu formats of the same name.

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

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

The sequence of presentation of the material in lectures is aimed at forming an indicative basis for students' subsequent assimilation of the material in independent work.

Practical exercises of the course are conducted in all sections of the curriculum. Practical work is aimed at developing students' skills of independent research work. In the course of practical classes, the master performs a set of tasks that allow him 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, there is the development of skills of independent research in the process of working with scientific literature, periodicals, the formation of the ability to defend one's point of view with arguments, listen to others, answer questions, and conduct discussions.

*Lectures* are focused on covering 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.

Independent work on the course *is especially important for the professional training* of students. 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, notes, annotating sources, writing tests.

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

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

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

Lectures:

### **1. Problematic lecture.**

The lecture begins with the teacher's statement of the problems, which are solved in the course of the presentation of the material. Answering a problem requires reflection from the entire audience. During the lecture, the students' thinking takes place with the help of the teacher's creation of a problem situation before they

receive all the necessary information that constitutes new knowledge for them. In this way, students try to find a solution to a problem situation on their own.

Educational problems are accessible in their complexity for students, they take into account the cognitive capabilities of the students, proceed from the subject being studied and are significant for the assimilation of new material and the development of personality - general and professional.

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

**Practical classes** are focused on the most fundamental and problematic issues and are designed to stimulate the development of one's own position on these topics.

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

### **Conference or Round Table**

When using this method, it is possible to invite various specialists who are engaged in the study of the problem under consideration or work on the 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 the one that is more interesting for them. The selected questions are passed on to the invited specialist of the "round table" to prepare for the presentation and answers. At the same time, several specialists engaged in the study of this problem may be invited to the round table. In order for the round table to be active and engaged, it is necessary to encourage the audience to exchange views and maintain an atmosphere of free discussion.

With the use of all these forms of classes, students get real practice of formulating their point of view, comprehending the system of argumentation, i.e. 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 master oral speech, to listen, hear and understand others, and to conduct an argument correctly and reasonably. Teamwork requires not only individual responsibility and independence, but also self-organization of the team's work, demandingness, 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 peculiarities 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 an action from one participant to another; Self-management skills are developed.

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

In the previous lesson, the teacher instructs 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 trainee must determine whether there is a problem in it, what it is, and determine his attitude to the situation. At the same time, each student should analyze the causes, course and results of the activities carried out by getting used to the role of specific historical figures. The practical lesson begins with an introductory speech by the teacher, in which the problems for discussion are voiced. In the course of the discussion, each of the students has the opportunity to get acquainted with the options for the solution, listen to and weigh the many of their assessments, additions, changes, enter into a dialogue and discussion.

In the course of discussing the issues of the practical lesson, the analytical skills of the trainers 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 based on the students' performances, makes 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. There are three more people - expert analysts.

The practical lesson is implemented in four stages:

The first is preparatory (carried out 1-2 weeks before the practical lesson). The teacher instructs about the purpose, content, nature, and rules of participation in the game. Student training 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 received proposals and ideas, which will allow you to purposefully and meaningfully analyze and summarize the results of the lesson.

Mutual criticism and evaluations are strictly forbidden, as they prevent the emergence of new ideas. It is necessary to refrain from actions and gestures that may be misinterpreted by other participants in the session. No matter how fantastic or improbable an idea put forward by any of the participants in the session, it should be met with approval. The more proposals are put forward, the more likely it is that a new and valuable idea will emerge.

Secondly, 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 thinking activities to search for non-traditional ways to solve problems, when discussing controversial issues, hypotheses, problem or conflict situations.

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

For current control and intermediate certification, an interview and a survey are conducted.

## **IX. LOGISTICAL SUPPORT OF DISCIPLINE**

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

In order to provide special conditions for the education of people with disabilities and persons with disabilities at 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 rooms and rooms for self-study	List of licensed software. Details of the supporting document
690922, Primorsky Krai, Vladivostok, Russky Island, Saperny Peninsula, Ajax village, 10, School of Biomedicine, aud. M 422, area 158.6 m <sup>2</sup>	Multimedia audience: Electric Screen 236*147cm Trim Screen Line; DLP projector, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; CP355AF Avervision visualizer, MP-HD718 Multipix camcorder; CORSA-2007 Tuarex Specialized Equipment Fastening Subsystem; Video Switching Subsystem: Audio Switching and Sound Reinforcement Subsystem: Power Amplifier, Wireless LAN Based on 802.11a/b/g/n 2x2 MIMO(2SS) Access Points.	
690922, Primorsky Krai, Vladivostok, Russky Island, Saperny Peninsula, Ajax village, 10, School of Biomedicine, aud. M 419, area 74.9 m <sup>2</sup>	Multimedia audience: Electric Screen 236*147cm Trim Screen Line; DLP projector, 3000 ANSI Lm, WXGA 1280x800, 2000:1 EW330U Mitsubishi; CP355AF Avervision visualizer, MP-HD718 Multipix camcorder; CORSA-2007 Tuarex Specialized Equipment Fastening Subsystem; Video Switching Subsystem: Audio Switching and Sound Reinforcement Subsystem: Power Amplifier, Wireless LAN Based on 802.11a/b/g/n 2x2 MIMO(2SS) Access Points.	
690922, Primorsky Krai, Vladivostok, Russky Island, Saperny Peninsula, Ajax Village, 10, Oud. M612, area 47.2 m <sup>2</sup>	Computer class for 22 workplaces: HP RgoOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200	

	SATA, DVD+/-RW, GigEth, Wi-Fi, VT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty (25 pcs.)	
Reading rooms of the FEFU Scientific Library with open access to the collection (building A - level 10)	<p>HP RgoOpe 400 All-in-One 19.5 (1600x900), Core i3-4150T, 4GB DDR3-1600 (1x4GB), 1TB HDD 7200 SATA, DVD+/-RW, GigEth, Wi-Fi, VT, usb kbd/mse, Win7Pro (64-bit)+Win8.1Pro(64-bit), 1-1-1 Wty Internet access speed 500 Mbps.</p> <p>Workplaces for people with disabilities are equipped with displays and Braille printers; equipped with: portable devices for reading flat-printed texts, scanning and reading machines, a video magnifier with the ability to adjust color spectrums; magnifying electronic magnifiers and ultrasonic markers</p>	

## IX. VALUATION FUNDS

### WOS Passport in the discipline "Bioinformatics"

Task type	Code and name of professional competence (result of mastering)	Code and name of the competency indicator
Research & Development	PC-1 Ability to calculate, assess and analyze indicators characterizing the activities of a medical organization and indicators characterizing the state of health of the population	<p>PC-1.1 Knows the principles of information collection and processing</p> <p>PC-1.2 Able to create a data matrix, encode material</p> <p>PC-1.3 Proficient in statistical methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet"</p>

Code and name of the competency indicator	Name of the assessment indicator (the result of learning in the discipline)
PC-1.1 Knows the principles of information collection and processing	Knows the principles of collecting, processing, analyzing, and providing information Able to collect, process, analyze and provide information in his/her professional activities Possesses the skill of collecting, processing, analyzing and providing information in their professional activities
PC-1.2 Able to create a data matrix, encode material	Knows how to encode information Able to create a data matrix, encode the material Proficient in coding material
PC-1.3 Proficient in statistical methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet"	Knows the basic methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet" Able to process data and present it Proficient in statistical methods of data processing, including the use of information and analytical systems and the information and telecommunication network "Internet"

### Monitoring the achievement of the course objectives

Item No.	Supervised modules/sections/topics of the discipline	Codes and Stages of Competency Formation		Valuation Tools – Name	
				Current control	Intermediate Attestation
1	Module 1. Introduction to Health Informatics. Basic Concepts of Medical Informatics. Features and types of medical information Topic 1.2	PP-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	Credit  Questions 1-5
			Can	UO-3, PR-11	
			Owens	UO-2, PR-4	
2	Module 2. Leveraging MExcel's Capabilities in Medical Data Processing Topic 3,4,5	PP-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	Credit  Questions 6-10
			Can	UO-3, PR-11	
			Owens	UO-2, PR-4	
3	Module 3. Processing and analysis of medical information Topic 6,7,8,9	PP-1.1; PC-1.2; PC-1.3	Knows	UO-1, PR-1	Credit  Questions 11-16
			Can	UO-3, PR-11	
			Owens	UO-2, PR-4	

## **Methodological Recommendations Defining the Procedures for Assessing the Results of Mastering the Discipline**

**Current assessment of students.** It is carried out in accordance with the local regulations of FEFU and is mandatory. It is carried out in the form of control measures: defense of a test work, interviews to assess the actual results of students' learning and is carried out by the leading teacher.

The objects of assessment are:

- academic discipline (activity in classes, timeliness of various types of tasks, attendance of 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 attestation of students.** It is carried out in accordance with the local regulations of FEFU and is mandatory. It provides for the consideration of the results of all stages of the course. Upon successful completion of the two stages of the current certification, the student is given an intermediate certification (test, exam).

**Test and examination materials.** When assessing students' knowledge, the intermediate control takes into account the amount of knowledge, the quality of their assimilation, understanding of the logic of the academic discipline, and the place of each topic in the course. The ability to freely, competently, logically coherently present what has been studied, the ability to defend one's own point of view with arguments are evaluated.

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

### **I. Assessment Tools for Attestation**

#### **Questions for the test**

1. Classification of computer networks by territorial basis: LAN, MAN, WAN networks.
2. Internet. Addressing to the Internet.
3. Internet services: e-mail, mailing lists, teleconferencing, World Wide Web (WWW), file transfer service (FTP), ICQ.
4. TCP/IP protocol stack.
5. Search for information on the Internet.
6. Popular Internet browsers. Search engines.

7. Major foreign search engines.
8. The main Internet protocols are http, telnet, SMTP, HTTP, FTP, POP. Email.
9. Data Protection. Methods of information protection: cryptography, electronic signature, authentication, certification of Web sites.
10. Saving Web pages. Specifics of saving pages that contain frames.
11. HTML. Interpret HTML tags. Basic building blocks of HTML.
12. Headings. Paragraphs. Logical partitions. Display preformatted text.
13. Lists: bulleted, numbered.
14. Creating hyperlinks.
15. Adding graphic elements.
16. Table. Table tag attributes.

**Criteria for grading a student at a test in the discipline  
"Bioinformatics"**

Assessment of the test	Requirements for the formed competencies
"Passed"	A grade of "passed" is given to a student if he/she knows the material well, presents it competently and to the point, without making significant inaccuracies in answering the question, correctly applies theoretical provisions in solving practical issues and problems, has the necessary skills and techniques for their implementation
"Not passed"	A "failed" grade is given to a student who does not know a significant part of the program material, makes significant mistakes, answers the questions with great difficulty. As a rule, a "failed" grade is given to students who cannot continue their studies without additional classes in the relevant discipline.

**Interview Questions**

**Sample topics of security questions:**

1. What is Medical Informatics?
2. Subject, Object and Purpose of Medical Informatics.
3. What are "Information" and "Health Information"?
4. How is biosignal converted into medical information?
5. What are the different types of medical information?
6. What is "objective and subjective information"?
7. What are the ways to obtain reliable medical information?
8. What are the components that ensure the availability of medical information?
9. How is information classified according to its relevance? Explain.
10. Describe the measures of medical information.

11. Describe the main functions of the MS Excel software application.
12. List the ways in which features are introduced.
13. List the Main Steps of Charting in Microsoft Excel
14. Analyze changes in input from the clipboard in different versions of MS Excel.
15. With which arithmetic sign does the function input begin?
16. How to label the data in the chart.
17. List the types of drawings that can be inserted into the MS Excel worksheet.
18. Tell us about the peculiarities of working with drawings in the Microsoft Excel software application. What is Healthcare Informatization?
19. What is the main goal of healthcare informatization?
20. List the functions of healthcare informatization.
21. What are the objectives of the development of healthcare informatization?
22. Sovremennaya sostoyanie informatizatsii zdravookhraneniia Rossii [Current state of health care informatization in
23. List the main problems of health informatization.

### **Assessment Tools for Ongoing Attestation**

**The control tests** are intended for students studying the course "Informatization of Healthcare".

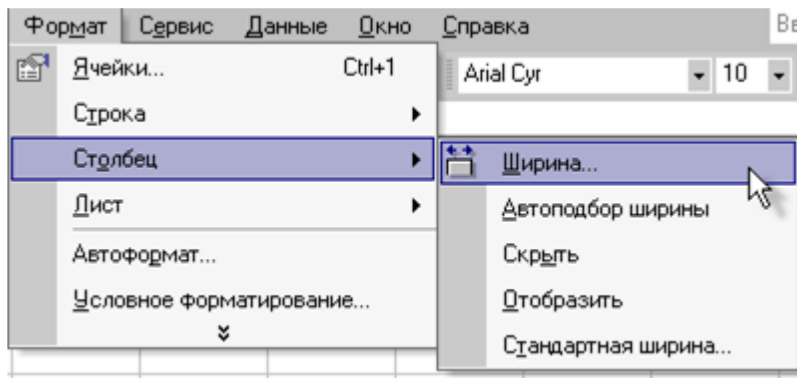
When working with tests, you are asked to choose one answer option out of three or four proposed. At the same time, the complexity of the tests is not the same. Among the proposed tests, there are tests that contain several options for correct answers. The student needs to provide all the correct answers.

The tests are designed for both individual and collective solutions. They can be used in the process of both classroom classes and independent work. The selection of tests necessary for the control of knowledge in the process of intermediate certification is made by each teacher individually.

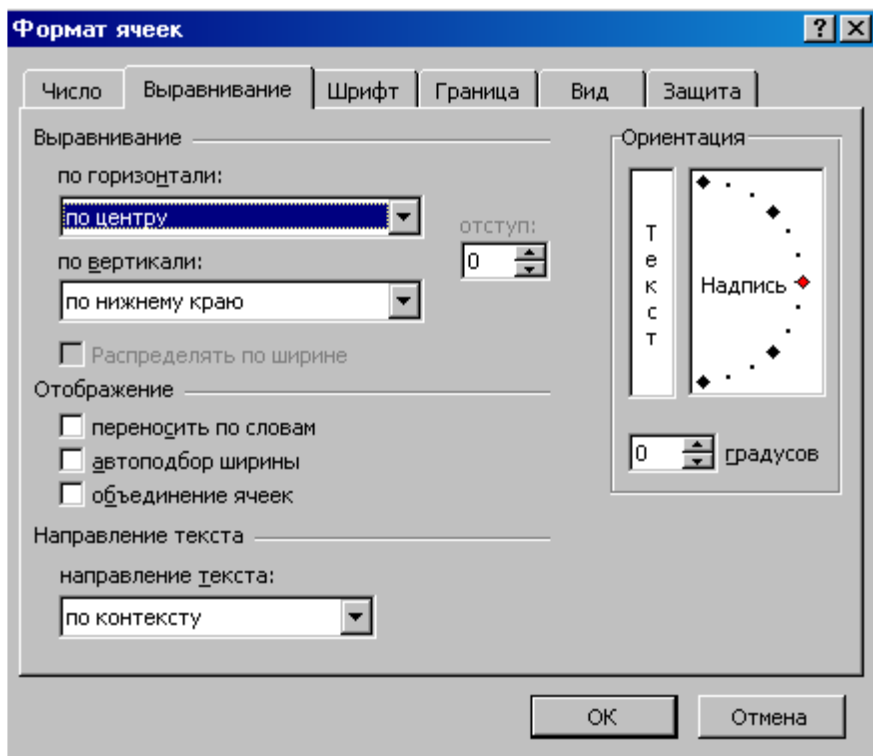
### **TASKS FOR TEST CONTROL OF KNOWLEDGE**

1. Change the width of column A as follows:
  - o Click on any cell in column A.
  - o Execute the Format - Column - Width command;





2. Autoformat the column width. To do this:
  - o select cells A1:D4 by placing the cursor on cell A1 and, without releasing the left mouse button, drag it to cell D4;
  - o Run the command Format - Column - Auto Width and click the OK button;
3. Set the alignment of the text in the cells:
  - o Select a block of cells B1:D4;
  - o Select Format - Cells - Alignment and set the alignment to the center, click OK.



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

- (a) Receiving e-mail;
- b) sending e-mails;
- c) Browsing the Web.

**2.The FTP service on the Internet is designed to:**

- 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 enable teleconferencing.

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

- a)bits/s;
- b)Mbps;
- c)Mbps;
- (d) KB/s;
- (e) Bytes;
- (f) MB

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

- a)management of data transmission equipment and communication channels;
- (b) Preservation of mechanical, functional parameters of physical communication in a computer network;
- (c) Interpreting the data and preparing them for the user level;
- d)delivery of information from the sending computer to the recipient's computer;
- (e) Splitting files into IP packets in transit and assembling files in the process of receiving.

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

- (a) Productivity;
- (b) Capacity;
- (c) Parallelism;
- (d) Reliability;
- (e) Capacity;
- (f) Integrability

**6. A domain is ...**

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

**7. Teleconferencing is ...**

- (a) Exchange of letters in global networks;
- (b) Hyperlinked information system;
- (c) A system for the exchange of information between subscribers of a computer network;
- (d) A service for receiving and transferring files of any format.

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

- (a) An adapter;
- (b) Switchboard;
- (c) A workstation;
- (d) the server.

**9. Identify the three most important methods of protecting information from illegal distribution:**

- (a) Encryption;
- (b) establishment of special attributes of files;
- (c) Automatic duplication;
- (d) Authentication;
- (e) Anti-virus

**10. A condensed image of the source code is usually used...**

- (a) As a key for encrypting the text;
- (b) As a public key in symmetric algorithms;
- (c) As a result of encrypting the text for its transmission over an insecure channel;
- (d) To create an electronic digital signature

**11. Which 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 the document?**

- a) `bgcolor`;
- b) `background`;
- c) `color`;
- (d) There is no correct answer

**13. How do I divide 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 tag <B>;
- (b) Using the tag <I >;
- (c) Using the <U" tag>

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

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

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

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

**17. The code of the program in the HTML language is ...**

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

**18. What defines the BORDER attribute of a TABLE markup element?**

- (a) Cell spacing;
- (b) The width of the cell;
- (c) The width of the border.

**19. A tag is:**

- (a) An instruction to the browser indicating how the text is displayed;
- (b) Text that uses special characters;
- (c) A pointer to another file or object;
- (d) A control sequence of characters for writing Web documents in Hypertext Markup Language.

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

- a)  ;
- b) <img background="ris.jpg"> ;
- c) <a href="ris.jpg">

**21. What will be displayed on the Web page when you write the following text on the page: <BODY BGCOLOR="BLACK"**

**TEXT="YELLOW"> AAA <FONT COLOR="RED"> BBB</FONT>  
</BODY>?**

- (a) Black background, "AAA, BBB" in yellow text;
- (b) Black background, "AAA, BBB" in 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. Internet Explorer allows you to...**

- a) upload NNTP newsgroups;
- b) upload Web pages via HTTP and files via FTP;
- c) chat via IRC;
- 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 to ...**

- a) only to make sure that the document has not been altered at the time of transmission;
- (b) Only to verify the authenticity of the document, but not to verify the authenticity of the document;
- (c) Either verify the correctness of the sender of the document or ensure that the document has not been altered during transmission;
- (d) Verify that the electronic document is not misrepresented and verify that the signature belongs to the owner

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

- (a) Decimal numbers between 0 and 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.uprInt.ru/picture/f11el.gif">;
- b) <IMG SRO="http://www.uprInt.ru/picture/f11el.gif">;
- c) <IMG SRC="http://www.uprInt.ru/picture/f11el.gif">.

**30.The TR tag specifies:**

- (a) A row in the table;
- (b) Table column;
- (c) The border of the table.

**31.Hyperlinks on a Web page may provide a link to...**

- a) only within a given Web page;
- b) only on the Web pages of this server;
- c) to any Web page in the region;
- d) to any Web page of any Internet server.

**32.The correct order of tags is as follows:**

- 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 you write the following text on the page: <TABLE WIDTH=50%> <TR> <TD> AAA </TD> </TR> <TR> <TD> BBB </TD></TR> </TABLE>?**

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

**34.The hyperlink is specified by the 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) The width of the frame;
- (b) The source of the image;
- (c) The height of the picture.

**36.The ALIGN attribute is used to:**

- a) alignment of objects on the screen;
- b) specifying the dimensions of the picture;
- c) to specify the thickness of the picture frame.

### **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. An "excellent" grade is given if you answer more than 90% of the tests offered by the teacher. A "good" score is given if you answer correctly on more than 70% of the tests. The grade is "satisfactory" – with a correct answer to 50% of the proposed tests.